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THE POLYGENIC ORIGIN OF SPECIES
MAN AND APE NOT RELATED

THE
POLYGENIC ORIGIN
OF SPECIES

MAN AND APE NOT RELATED

By
EDGAR H. R. EVANS

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TO
THE MEMORY OF
JOHANNES MULLER

In 1833 appeared Johannes Muller's classical Manual of Human Physiology, in which the great biologist did not regard vital activity as a metaphysical "vitalism"—like Heller, Kant, and their followers—but "as a natural force, subject, like all others, to fixed chemical and physical laws, and subordinate to the whole".

(HAECKEL'S *The Wonders of Life*.)

“ Commonness of acceptation is no infallible sign of any opinions being true and right, neither is antiquity.”

BACON.

“ Sit down before fact like a little child, be prepared to give up every preconceived notion, to follow humbly wherever and to whatever abysses nature leads you, or you shall learn nothing.”

HUXLEY.

P R E F A C E

The old idea of the immutability of species supposed that each species was a "separate creation" fully developed just as it is to-day. The present view, I believe, errs in the opposite direction of too much mutability, for it supposes that not only all species of animals, but all living things—plant and animal—have been evolved from one microscopic speck of protoplasm.

I believe that the old view was nearer the truth, but instead of each species being a "separate creation", each has been a "separate evolution" from a separate speck of protoplasm, from which each has been evolved along its own line—the line determined by the specific chemical constitution of its original speck of protoplasm.

The view here put forward, therefore, while differing from the old view of immutability, is in full accord with the present view of mutability (descent with modification) but differs from it in regarding existing species as the present apices of separate basal stocks *ab initio*, and not as all evolved from one speck of original protoplasm.

Does any educated man seriously believe, for instance, in common parentage (even at the protoplasmic stage) between himself and the thousands of species of *Bacteria* of the air, of the soil, of fermentation, of disease, etc.? Yet this is the literal implication of the Darwinian theory of the common origin of all life.

The position, it seems to me, really amounts to this —if all life has not originated from only one speck of protoplasm, it must have done so from more than one, and how many more than one? If from many more than one, surely it is time to recognize this, and to remove the constricting influence upon biology of the prevailing view, while applying the broader view as far as the facts will allow.

E. H. R. E.

ALEXANDRIA,
CAPE PROVINCE,
SOUTH AFRICA.
27th December, 1933.

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CHAPTER I

ADAPTIVE MODIFICATION

The living cell is the greatest wonder in organic nature. How has the living cell come to *know* of itself?

Someone has aptly remarked that "every living cell is an individual of the first rank".

The cell has no brain, yet it must possess some structure which is the seat of its "psychic sense".

Psychic sense in the cells, however, seems to be more in the nature of a subtle *instinct*—strong, definite, and unerring.

The more the highly specialized cells of the brain have taken over the work, and the more efficient the brain has become as the instrument of "mind" the less need the organism has had for the use of "instinct" or "cell-memory".

The newly born animal, however, being an *absolutely new individual without previous experience*, is still dependent upon, and therefore still uses this hereditary "cell-memory" with unerring certainty of what to do.

What but an inborn hereditary "cell-memory" tells the newly born mammal to seek its mother's teat? As an individual entity that has not existed before, it has had no experience at all of what to do. It is an entirely new individual entering upon its first experience of meeting the needs of its individual life.

Again, what tells the embryo chick, when the time comes, to puncture the shell of the egg with the little horn-like point near the end of its beak? Here again,

as an individual entity that has not existed before, the chick has had no experience of what to do when the precise time comes to do it. "Instinct" you say? This is only another name for hereditary "cell-memory" in the embryo.

All the multi-cellular organisms (which include the highest) consist of groups of specialized cell-units. Just as the life of the organism is the sum of life of all the cell-units, so we may infer is the "consciousness" of the organism the sum of "consciousness" of all the cell-units.

It is plain that mere "sensitiveness" or "reaction" to stimuli, which may well be in its origin a purely physico-chemical phenomenon, is the *initial stage* of higher "consciousness".

It is difficult to separate psychic action in the cells from purely physico-chemical phenomena. Haeckel considered the two cannot be separated.

The apparently adaptive *purpose*, therefore, which we find associated with definite morphogenesis in the organism, may well be due to a psychic sense in the cells, and a *psycho-physical adaptive response* to stimuli by the plastic cells of the embryo.

The cells of the embryo, in the course of countless generations of functioning in the same way, have become highly plastic and responsive to the slightest impulse from stimuli acting upon them *through the sensory nerve-centres of the parent*.

Lamarck was the first to perceive and stress the importance of *use* in the adaptive modification of organs, but he was mistaken in supposing that adaptive modification under the stimulus of use, begins in the mature structures of the parent.

It can only take place (via the sensory nerve-centres of the parent) through the cells of the embryo, that is

—*during the only plastic stage of each generation.* The mature organs of the parent are structurally *unresponsive* to stimuli, and cannot undergo structural modification for transmission to offspring. It is just here that Lamarck was mistaken.

Weismann, on the other hand, was the first to perceive and stress the important fact that structural modification can only take place through the germ-plasm. But where Weismann also was mistaken is his denial of the possibility for the germ-plasm to be affected by stimuli acting upon the soma of the parent. Thus the theories of both Lamarck and Weismann—as put forward by them — are half-explanations of progressive development.

No Parentally Acquired Character can become Species Character

No *parentally* acquired peculiarity can become species character. It is an abnormality not in line with *heredity* in the species, and could only be preserved and perpetuated by systematic artificial selection and mating of individuals of both sexes possessing it.

Even, therefore, were it possible in a very rare case for an individual parentally acquired peculiarity to be transmissible to offspring in the first generation, it could not, under the haphazard mating of individuals in nature, be perpetuated, and must inevitably become swamped (like spontaneous variations) by intercrossing with normal individuals of the species.

Suppose, for the sake of argument, that the ancestors of the giraffe had shorter necks than the existing giraffes. Suppose further that it had been possible for one individual of those ancestors to have lived for thousands of years to the present time.

No amount of neck-stretching during all those thousands of years would have added a fraction to the inherited length of the parental neck. Increased length of neck could only take place gradually by adaptive modification of the embryos of many successive generations under the stimuli of constant use, transmitted via the sensory nerve-centres of the female parents.

The length of neck and forelegs of the giraffe are not, however, as popularly supposed, the result of its habit of feeding upon the leaves of trees, but the habit is no doubt the result of these convenient features inherent in its structure. Its neck contains no more than the normal seven cervical vertebræ.

The mere fact that the giraffe takes advantage of its conveniently long forelegs and neck to feed off the branches of trees, has in turn been taken advantage of as "proof of natural selection".

The long necks of such species as the giraffe, camel, dromedary, okapi of Africa, and Auchenia of South America, no doubt are inherent structural features possessed by them all from their reptilian phases.

No doubt, too, there are many instances of structural peculiarities which are inherent in the organism as the result of its specific chemical constitution from the beginning, which have been taken advantage of by it for the purpose of defence, or have decided the choice of environment, of food and the manner of obtaining it. The giraffe and ant-eaters are cases in point.

On the other hand, there can be no doubt that the specialized organs of the great majority of animals are the result of adaptive modification of the embryo under the constant stimuli of use.

Striking evidence of this is seen in the adaptive modification of organs for leading an arboreal life

found in practically all the mammals (and even the beetles) inhabiting the forests of Brazil.

Not Parentally "Acquired Character"

The Axoltls are remarkable gilled salamanders (*Sire-don pisciformis*), which belong to the lower order of amphibia and live in the Lake of Mexico. They live mainly in the water, and "remain throughout life at the same stage as the dipneusta"¹—breathing by lungs or gills as may be required.

So long as they continue to live in water, they breathe by gills. Should any of these Axoltls happen to take to living on dry land, the gills disappear and they then breathe by lungs. So long as they continue to live on land, breathing by lungs, they produce offspring without gills which breathe by lungs like their parents.

Being amphibians, these Axoltls have for ages lived partly in the water and partly on the land. They have thus, no doubt, during countless generations of amphibian ancestors, gradually acquired, by adaptive modification of the embryo under the constant stimuli of use, an hereditary power of rapid adaptation of their breathing organs to use in either of the environments of water or land.

This rapidly adaptive power, therefore, is a kind of dual Mendelian inheritance, gradually acquired by their ancestors, and which they are able to transmit, as Mendelian inheritances, to their offspring in either form—gills or lungs—as may be required either for life in the water or life on land.

Thus, instead of being, as supposed by some writers, evidence of the all-might of "environment", these

¹ Haeckel's *The Evolution of Man*, vol. xi, p. 584.

instances are rather evidence of the all-might of "inheritance". Nor is there here any "*parentally* acquired" character which has been transmitted to offspring. It is a dual Mendelian ancestral inheritance, which began in their *Dipnoi* ancestors.

The embryos of the fruit fly manifest a most abnormal degree of hypersensitiveness under experimental breeding in the laboratory.

For example, the embryos of those fruit flies which are kept under artificial conditions of moist and cold air in the laboratory, develop certain excessive abnormalities of structure. These abnormalities take place in the embryos of parents whose structures are quite normal. Which proves that they are not "*parentally* acquired" characters.

If now the fruit flies are made to live in the laboratory under dry air conditions, the abnormality disappears from the embryos of parents which possess it!

Since then these abnormalities only appear in the embryos of flies kept under artificial moist or cold air conditions in the laboratory, and disappear as soon as the flies are kept under dry air conditions from even the embryos of those parents which possess them—no true Mendelian inheritance behaves like this.

The further fact, that if a father possesses them all his daughters inherit them, but none of his sons do so—while the daughters hand it on only to half their sons and half their daughters—no true Mendelian inheritance behaves like this.

It seems clear from reported details of these experiments, that the abnormalities only persist as long as the flies are kept under the artificial moist or cold air conditions of the laboratory. That is to say only as long as the artificial disturbing cause persists.

It would thus appear that it is not a case of

“inheritance” at all, as supposed by some writers, but of *repeated reaction to the artificial disturbing cause* by one of the genes in the X-chromosomes of each generation, whether possessing the abnormality or not.

This is shown by the fact that when the flies are kept under normal dry air conditions, the abnormality disappears even from the embryos of parents which possess it.

So that these are doubtless merely *artificially produced abnormalities*, and as such, of little, if any, biological value or significance, and serve to show the mistake of drawing important and generalized conclusions as to the all-might of mere “environment”, from artificially produced abnormalities such as these.

No Transmission of Mutilations

To Lamarck's view that structural modification begins in the mature structures of the parent, is probably due the prevailing confusion on the subject of “acquired character”, and the question of the transmission of injuries and mutilations.

Scars caused by injuries and mutilations cannot be transmitted to offspring for the simple reason that, owing to their transient nature, they are not stimuli in the proper sense of the word, and therefore cannot bring about modification in the structures of the embryo.

The embryo can only be modified by stimuli acting *continuously* upon it, in a *definite way*, through the sensory nerve-centres of the mother parent.

Mutilations, such, for instance, as the practice of docking the tails of lambs and puppies, and that of circumcision, though practised for many generations

over many centuries, cannot possibly be transmitted, because in the first place lambs, puppies, and boys have no embryonic machinery to be influenced, and in the second place, even if they had, it must be remembered that, no matter how many individuals were subjected to the mutilations named, it would be, in effect, only one transient experience for every individual in each generation. How could the embryos be influenced, even if there were any?

No wonder that although many millions of individuals have for centuries been subjected to the mutilations named, there has not been a single instance of transmission, and there never can be.

Yet, owing to the influence of the Lamarckian idea, so total a misconception of the whole matter seems to prevail, that well-informed writers have expressed some surprise that none of the long-practised mutilations referred to have ever been transmitted to offspring.

In Dr. Brown-Sequard's experiments with guinea-pigs it was found that in some thirteen cases in which guinea-pigs had caused self-mutilation by chewing off portions of their hind legs, the offspring were born without toes.¹

These cases have been cited as instances of transmission of *parentally* "acquired character". They are, however, not phenomena arising under *ordinary* circumstances at all, as can be seen from the massive evidence that goes to show that mutilations are *not* transmissible under ordinary circumstances.

No doubt these were all cases of guinea-pigs with embryos in the plastic stage of development, and can only be attributable to *brain influence*, and the stimuli

¹ *Encyclopædia Britannica*, 9th edition.

of nervous shock conveyed through the sensory nerve-centres of the parent to the corresponding plastic structures of the embryo.

A remarkable case of brain influence causing modification of the embryo under nervous shock sustained by the mother has recently occurred on the farm of one Mr. Marais near East London, Cape Province.

The following details appeared in the *Daily Dispatch* of 1st October, 1930, published at East London, Cape Province.

"An amazing case of the effects of pre-natal influence in animals has just come to light. Yesterday a *Dispatch* representative, in answer to a telephone message, went out to see a Mr. Marais, at Vincent. Mr. Marais has a cow which was attacked some three months ago by a bulldog. Yesterday morning, as anticipated, the cow gave birth to a calf, which was born with a perfect bulldog's head and tail. The calf, when our representative saw it, was dead, but at first glance it appeared as if one were looking at a bulldog. The jowl, the sunken nostrils, the little ears were all pure dog, as was the little corkscrew tail. The cow appears to be in a perfectly normal condition."

Captain Myers writes as follows from the Civil Service Club, Capetown: "I personally saw the calf, and can swear to the accuracy of what I have written."

A snapshot picture taken of the calf shows the head being held up by the tips of its dog-like ears (*see* Frontispiece).

The same phenomenon of nervous brain influence is seen in the cases of "pre-natal influence" in the human embryo, in which a facsimile of the form of objects thrown upon the retina of the mother's eye,

under nervous shock, takes place in the embryo during the plastic stage of embryonic development.

Such instances go to show that *modifying stimuli* can be conveyed to the structures of the embryo by *purely nervous transmission, through the sensory nerve-centres of the parent*.

The modifying stimuli of *use* are, in the same way, constantly conveyed to the corresponding plastic structures of the embryo, thus causing continuous *adaptive* modification of organs.

Since guinea-pigs breed every few weeks, the many experiments conducted by Dr. Brown-Sequard will naturally have caught many cases with embryos at the plastic stage of development when chewing off a portion of their hind legs, and would account for the number of instances of so very rare a phenomenon.

Abnormalities, such as the toeless guinea-pigs, and "pre-natal influence" in the human embryo, are merely the result of *transient nervous shock* emanating from the brain of the parent (thence conveyed by nervous transmission to corresponding parts of the embryo) and are not transmissible as Mendelian inheritances.

Mendelian inheritance of "spontaneous variations" or "sport" characters, on the other hand, is altogether a different thing. They are the result of *abnormal chemical changes* in the genes of the chromosomes, and are transmissible as *abnormalities*.

Had Dr. Brown-Sequard carried out breeding experiments with the toeless generation of guinea-pigs, he would no doubt have found that there was no further transmission of the self-inflicted mutilations suffered by their mothers under acute nervous distress.

It may, perhaps, be pointed out just here, that in all normal adaptive modification of the embryo under the

stimulus of use, the male parents of each generation, having no ovum or embryo for modification by stimuli, transmit through the sperm cell modification of organs acquired by them *during their embryonic stages* under the stimuli of use acting through the sensory nerve-centres of their mothers.

In oviparous animals, adaptive modification of the embryo probably begins to take place (through the sensory nerve-centres of the parent) even before, or at once after fertilization of the egg, at which stage "the substances which will give rise to ectoderm, endoderm, mesoderm, muscles, notochord, and nervous system, are plainly visible in their characteristic positions".¹

The embryo is not conceived of as the parent's body in miniature. Nevertheless, the cells which produce the various parts of the body are probably all there in an embryonic stage, and in their relative places in the mosaic of bodily parts.

Embryo only Structurally Plastic Stage of Each Generation

The mature structures of the parent being incapable of structural response to stimuli, it is plain that the embryo is the only structurally plastic stage of each generation.

This is also seen in the embryo of the bee, which is only capable of *structural response* to change in the chemical character and quantity of food fed to it during the first two days of its development. From the second day onwards the structures of the developing larva

¹ Loeb in *The Organism as a Whole*, chap. vi, p. 146.

have already become *incapable of modification*, by loss of plasticity.

The phenomena of "spontaneous variations" or "sport" characters also plainly show that modification of the embryo takes place without first being "acquired" by the structures of the parent.

From its earliest stage the embryo is as absolutely a living part of the parents' organization as are the brain, nerves, and other organs of the parent. Parent and embryo here are one, while the embryo alone is plastic.

In effect, therefore, it is precisely as though the stimuli were acting directly upon the plastic cells of the embryo itself, while the only means whereby the stimuli can be conveyed from parent to embryo is by *nervous transmission*.

It can thus be seen how directly transmissible to the cells of the embryo are the stimuli of use acting *constantly in the same way* upon the sensory nerve-centres of the parent. Only in this way can adaptive modification of organs take place.

Adaptive Modification

It is, then, this process of *adaptive response* to stimuli by the plastic cells of the embryo which, for want of a better term, I have called "Adaptive Modification".

This term is chosen advisedly in clear contradistinction to the entirely different process of "Spontaneous Variations" — the supposed cause of progressive development in Darwinism.

Throughout the literature of "natural selection" it is distinctly implied that all variation is "spontaneous", and it is upon these "spontaneous variations" that natural selection is supposed to

act. Indeed, the very term "natural selection" implies this.

The inherent weakness in this theory is that the important process of adaptive development is made to depend upon "spontaneous variations"—just pure chance in fact.

The Darwinian theory is thus at bottom a "mutation" or "sport" theory, and as such possesses the weakness inherent in all "mutation" or "sport" theories put forward as stable evolutionary factors in the animal kingdom.

There is an important difference between continuous *modification* of the embryo in a definite direction, and spontaneous *variation*. For instance :—

(1) *Continuous modification* takes place under the constant stimuli of use (through the sensory nerve-centres of the parent) always in the *same definite direction in the embryos of all the individuals of the race* from generation to generation.

(2) *Spontaneous variations*, on the other hand, take place always in *different directions* in the embryos of isolated individuals only, and therefore cannot, under natural conditions, be preserved so as to become hereditary race characters.

Even, however, were it possible for "spontaneous variations" in animals to be preserved under natural conditions, they would inevitably tend to disintegration of race character, being, from their very nature, variations in *different directions*.

Adaptive modification of the embryo on the contrary—acting *always in the same definite direction*, under the constant stimuli of use of organs, is the very reverse of "spontaneous".

Thus, the important process of adaptive development

is removed from the sphere of pure chance to that of *definite physical forces*.

Colour "Mimicry"

This is a purely embryonic process usually ascribed to the supposed action of "natural selection".

The epidermal cells of chameleons and some other animals possess the physico-chemical power of rapidly adapting the colour of their skins (via the optic nerve, no doubt) to the colour of objects looked upon by them. This must be due to a peculiarity of cell chemistry inherent in the organism from the beginning.

Such instances explain how the colour of surroundings, constantly looked upon by certain kinds of animals possessing this peculiarity of cell chemistry, can be transmitted, via the optic nerve of the parent, to the cells of the embryo, and after many generations become fixed hereditary characteristics.

This is seen in the green colour of certain insects constantly inhabiting green foliage, in the red colour of certain marine organisms living in the neighbourhood of coral rocks, the yellow colour of certain animals living in sandy deserts, and the white colour of certain animals living in the arctic regions of perpetual snow.

Not only the *colour*, but the *form* of foliage constantly looked upon by certain insects, can likewise be transmitted (via the optic nerve of the parent no doubt) to the embryo, until after many generations, as seen in the "Leaf" and "Walking Stick" insects, the bodies of such insects become exact facsimiles of the foliage they constantly inhabit.

That the "form" of objects looked upon by the parent can be transmitted to the embryo, via the optic nerve, is shown by the instances of "pre-natal influence" already referred to.

Use and Disuse of Organs

There are certain frogs inhabiting isolated islands with a dry climate which, as the result of long intervals without the fresh water indispensable to tadpoles, have, by gradual modification of the embryo, dispensed with the normal tailed, gill-bearing tadpole stage, and are now produced from the egg as fully developed, tail-less and gill-less frogs !

It would be a mistake to suppose that this change in the historical metamorphosis of these frogs has taken place as the result of any kind of "environmental" stimuli acting upon the embryo in the usual way through the sensory nerve-centres of the parent.

Since the change in the islands from a wet to a dry climate will probably have taken place gradually over a very long period of time, the adaptive modification of the embryos to the changing conditions will no doubt have been a very gradual process.

As the freshwater supply so indispensable for the tadpole stage (really a larval stage) became gradually less and less, the tail and gills of the tadpoles became of necessity *less and less used*.

These organs have, therefore, simply degenerated and disappeared under *disuse* in the larval stage, which could only have come about by Mendelian inheritance from generation to generation, of an *ever decreasing development* of tail and gills under disuse during the larval stage.

Nevertheless, the embryos must have become by slow degrees modified (as the result of disuse of these organs in the tadpole stage) to omit the historical tadpole stage altogether in these island frogs.

Modification, it should be here noted, is strictly confined to the embryonic and tadpole stages only. There has been no "parentally acquired" character

for transmission. The structure of the mature frogs has remained absolutely unchanged.

The all-important part played by *use* in the development of organs becomes obvious when we see organs degenerating and finally disappearing from no other cause than that of *disuse*. We may, therefore, be perfectly sure that they have been, in the first instance, developed under the stimulus of *use*.

When organs degenerate and disappear, it is not because the hypothetical factor of "natural selection" has ceased, but because the stimulus of *use* has ceased to act upon the embryo.

When Darwin states that "natural selection . . . acts solely by the preservation of *useful* modifications", this really means that organs are preserved solely by *use*.

The hypothetical factor of "natural selection" may be here left out of the question. This superficial application of the theory reveals its weakness.

Darwin at times appears to have recognized the all-important part played by *use* in the development of organs, for he says, "the external conditions of life, as climate and food, seem to have induced some slight modifications. . . . Use in strengthening, and disuse in weakening and diminishing organs, seem to have been more potent in their effects."

Again he remarks, "It is well known that several animals belonging to the most different classes, which inhabit the caves of Styria and Kentucky, are blind. In some of the crabs the foot-stalk for the eye remains, though the eye is gone: the stand for the telescope is there, though the telescope with its glasses has been lost. As it is difficult to imagine that eyes, though useless, could be in any way injurious to animals living in darkness, I attribute their loss wholly to disuse."

If then the loss of the eyes of animals living in darkness is attributable "wholly to disuse", we may be quite sure that these organs have in the first instance been developed *wholly by use* under adaptive modification of the *embryo* (not the parent).

On the one hand we see that structures *disappear under disuse* even during the larval stage of an organism—as shown in the case of the dry island frogs.

On the other hand that structures *appear under use* even during the embryonic stage of an organism—as shown by the hardened tips on the beaks of embryo chicks, used for puncturing the shell of the egg.

All the instances of *embryonic* structural modification referred to, namely—the embryo chick, the larvæ of the bee, the fruit fly, and the frog, being none of them "parentally acquired" modifications, go to show that the *embryo is the only structurally plastic stage of each generation*.

It is, however, important here to note that adaptive modification of the embryo is *confined to the modification of organs under the stimulus of use*, and cannot determine the type of the organism.

This is shown by the fact that the appearance and disappearance of organs by use or disuse take place while the *type of the organism as a whole* (reptile, bird, or mammal) *remains the same*, which fact goes to show that *type* is something specific and inherent in the organism itself, and that *organs do not make the type, but conform to it*, as will be shown in the next chapter.

CHAPTER II

COMMON PARENTAGE THEORY

The Darwinian theory of common parentage, while based upon "structural resemblance", arrives at the conclusion that man and microbe—nay man and thistle—have a "common ancestor!" Where this idea is not explicitly so stated, it is more or less vaguely implied.

Darwin's own references to this fundamentally important point are characterized by a vague ambiguity of expression. In one place he says, "I believe that animals are descended from at most only four or five progenitors, and plants from an equal or lesser number. Analogy would lead me one step further, namely, to the belief that all animals and plants are descended from some one prototype."

In every instance in which Darwin refers to this point, he concludes with a direct or implied expression of belief that "all the organic beings which have ever lived on this earth may be descended from some one primordial form".

It is, however, worthy of note that there is in these remarks of Darwin's at least a vague implication of *separate origins* for plants and animals.

As a matter of fact there exists no reason whatever for assuming that all terrestrial life has originated from "some one primordial form"—whatever that may mean.

The profusion and variety of living forms are an eloquent protest against so narrow an outlook as this.

There is scarcely an inch of land or sea or air where there is not life of some kind. The very air we breathe teems with myriads of invisible forms of life, many too minute to be detected by the strongest microscope.

There is no need for fantastic speculations as to the possibility of life upon this planet having been originally transported through space from some other planet, in the form of "spores" so minute as to be uninfluenced by the attractive force of gravitation. (Arrhenius, Kelvin, etc.)

We may, however, be quite sure that the physico-chemical agencies necessary for the generation of life have existed right here upon this planet from the beginning, as no doubt they have upon all other planets which have been evolved from the same cosmic elements as this.

As to the beginnings of life, nature creates with a boundless lavishness, from electrons to the giant orbs in space. The latest computation of the number of the stars, for instance, is said to be in the neighbourhood of thirty thousand millions !

A still later computation of the number of the stars is stated by Sir James Jeans to be one hundred billion.

And each of these stars is the central sun of a solar system with planets revolving round it !

That there are highly developed beings inhabiting many of the planets revolving round the millions of suns, we need have no shadow of doubt.

It is not likely that our solar system is the one solitary instance of its kind in the infinite universe, even if, owing to their great distance, no other planetary systems can be detected with the telescope.

Suppose there had happened to be a sister planet to this earth, similar in all respects. No doubt there

would have been many similar, and many identical forms of life evolved on both planets. Would it have been supposed that the similar forms on the two planets must be related in some way by "common parentage" because of their structural resemblance?

Chemical Determination of Type and Species

Every species of plant and animal, from the lowest to the highest, possesses its own specific chemical constitution, which doubtless has been so from the beginning. Each species of plant and animal has evolved along its own line—the line determined by the specific chemical constitution of its primordial parent cell.

So that the chemical constitution of the mesenchyme cells, the specific synthetic enzymes, and hormones, must have been definitely predetermined by the specific chemical constitution of the primordial parent cell.

The mesenchyme cells, therefore, bound by physico-chemical laws as definite as crystal structure, must build along *definite structural lines*—plant or animal, arthropod, mollusc, or fish, bird or mammal—lines determined in the first instance by the specific chemical constitution of the protoplasm from which the primordial parent cell was evolved.

It follows that an organism evolved from a primordial parent cell of a given specific chemical constitution can no more deviate from certain definite morphogenic phases, such as fish—reptile—bird—mammal—than can the element uranium deviate from the definite progressive phases—uranium, radium, lead.

"The crystal and the amœba take their places as independent products of physical and chemical change,

and cannot do other than obey the law of their development." (Clodd's *The History of Creation*.)

Though all living things are composed of the same ingredients, the *differences lie in the mixing*—that is in the specific chemical constitution of original protoplasm.

According to the arrangement of the atoms in the molecules of carbon, the *type* of the structure is determined—whether it shall be coal, graphite, or diamond ; and likewise, according to the specific chemical constitution of original protoplasm, the type of the organism is determined—whether it shall be plant or animal, arthropod, mollusc, or fish, bird, or mammal, horse or zebra, lemur, monkey, or ape.

Referring to modifications of protoplasm, Huxley remarks, "Enough has perhaps been said to prove the existence of a general uniformity in the character of the protoplasm or physical basis of life. . . . But it will be understood that this general uniformity by no means excludes any amount of special modifications of the fundamental substance." (*Lectures and Essays*.)

"When we speak of the living matter or protoplasm, the general phrase does not imply that the substance may not have a distinctive composition in each particular case." (Haeckel's *The Wonders of Life*.)

Had all primordial protoplasm possessed precisely the same specific chemical constitution, all organic forms would have been of one type. There could have been no differentiation of type—plant, animal, arthropod, mollusc, fish, etc.

On the other hand, "spontaneous variations," the basis of Darwinism, could never, from "*one primordial form*", have produced types so different as plant, animal, arthropod, mollusc, etc.

These fundamentally diverse types, therefore, can

only be due to differences in the specific chemical constitution of original protoplasm.

Had type differentiation depended upon mere "spontaneous variations" in the organism at a *later* stage, the door would have been left open to unrestrained variation, resulting in universal chaos and confusion of types, instead of the rigid specificity seen throughout all geological periods.

Both palæontology and embryology show that thousands of distinct species and genera have passed through definite progressive morphogenic phases, such as fish, reptile, bird, and mammal.

The Darwinian theory of the origin of species by "spontaneous variations" is incompatible with definite progressive morphogenic phases. "Definiteness" excludes spontaneous "divergence".

All the species of the same genus, family, order, or class, though in no way related (being merely grouped together for "structural affinities") pass through the same definite progressive morphogenic phases.

Definite Morphogenesis

It has been pointed out that an organism evolved from a primordial parent cell of a given specific chemical constitution can no more deviate from certain definite morphogenic phases—such as fish, amphibian, reptile, bird, or mammal—than can the element uranium deviate from the definite progressive phases—uranium, radium, lead. "Each organism," says Professor Loeb, "is characterized by a definite form, which is determined by definite chemical substances."¹

The bodies of all the *insecta* consist of exactly twenty segments, while those of all the typical *crustacea* consist

¹ Loeb in *The Organism as a Whole*, chap. xi, p. 14.

of exactly twenty-one segments. This can only be due to definite physico-chemically determined morphogenesis, quite independently acquired by each species throughout the whole of these two great classes, and have nothing to do with "common parentage". The same holds good of "dentition" generally, which is merely of use in "classification" and nothing more.

Definite morphogenic phases, such as fish to amphibian, amphibian to reptile, reptile to bird or mammal, could only have taken place in those types of Devonian "freshwater" fishes possessing certain specific chemical constitutions. Only specific types of fishes could become amphibians. This would account for why it is that some of the early Devonian fishes have developed into the highest forms of to-day and some have not.

"Natural selection" utterly fails to account for why a fish becomes an amphibian, an amphibian a reptile, and a reptile a bird or mammal.

If these definite morphogenic phases were due to mere environment, we should find all marine animals either mollusca or fishes, and all land vertebrates either birds or mammals.

Definite physico-chemically determined morphogenesis is the only explanation of all the above facts.

The Lesson of Embryology

Because the embryos of all plants and animals first take the form of a single cell, it does not follow that all plants and all animals, therefore, have been derived from the *same* primordial single-cell progenitor.

The germ-cell of every individual plant and animal

is, in its first embryonic stage, merely recapitulating the *first stage* of its own primordial single-cell progenitor.

We are apt to look upon the beginning (protoplasmic) stage as the least important stage in the evolution of the organism. *It is by far the most important.*

We see this in the early and permanent differentiation between the plant and animal kingdoms. Plants and animals have no doubt been derived from two chemically specific groups of primordial cells, and these from chemically specific protoplasms.

Besides a host of other fundamental differences, plants and animals differ fundamentally in that plants take in carbonic acid and give out oxygen, whereas animals on the *exact contrary* give out carbonic acid and take in oxygen—a more opposite behaviour and requirement it is impossible to conceive or find, clearly betokening distinct physico-chemical origins in protoplasm.

Thus we see that some organisms have been, from the very first, physico-chemically determined to become plant in type, and others to become animal in type, while their life functions were still purely physico-chemical processes.

These facts indicate that it is during the protoplasmic stage of the evolution of the organism that its "place in nature" (its type)—plant, animal, arthropod, mollusc, fish—and *even its species in all these distinct groups*—has been permanently determined.

In the simplest single-cell organisms—the *bacteria*—we see that *distinct species already exist*—a specificity which must have been inherent in protoplasm itself, seeing that the *bacteria* are themselves just tiny specks of structureless plasm.

That the type of the organism has been determined

by the specific chemical constitution of original protoplasm appears to be further indicated in the simplest forms, for instance, in the Radiolaria and other Protists—"the body in the same way as crystals may be traced to a mathematically determinable fundamental form." (Haeckel's *The History of Creation*.)

When it is remembered that the very elements of which matter is composed all possess their distinctive physical and chemical properties, it is seen how profoundly organic structure must be influenced by the specific chemical constitution of the cells of which the structure consists.

How direct and close is the relationship between the chemical constitution of the cells and the structure of the organism is clearly shown by such facts as the following :—

(1) "Each organism is characterized by a definite form which is determined by definite chemical substances." (Loeb in *The Organism as a Whole*.)

(2) The legs of tadpoles can only be developed when a certain chemical is developed by the specialized cells of the thyroid glands of the animal. (Gudernatsch's experiment.)

(3) Sex character is entirely due to chemicals developed in the sex organs by cells specialized for the work.

(4) Specialized groups of mesenchyme cells produce legs, eyes, etc., in the embryo. If grafted on other parts of the embryo they will still produce legs and eyes in parts of the body where they do not belong (Loeb in *The Organism as a Whole*.)

(5) The cells of crabs, lobsters, newts, etc., it is well known, possess the physico-chemical power of

growing entirely new limbs, which are an exact reproduction of those accidentally destroyed.

The foregoing facts all go to show how specific is physico-chemical action and how close is the relationship between the chemical constitution of the cell and the structure of the organism.

Organisms, therefore, evolved from protoplasms possessing close chemical affinity would, from the beginning, evolve along lines of close structural affinity.

For example, in two species as similar as the horse and zebra, there has no doubt been a close structural affinity between them from the beginning, and during every phase of their advance, running parallel from phase to phase as two similar species of fishes, of amphibians, of reptiles, and finally of mammals, as we see them to-day—*always very similar, but never the same.*

The horse and zebra each having passed from fish to amphibian, amphibian to reptile, and reptile to Mammal, these are definite morphogenic phases through which horse and zebra have each separately passed, and should not be confused with the idea of the derivation of species from species, by which would be meant the "divergence" by "spontaneous variations" or "sports", of one species of horse or zebra into another distinct species of horse or zebra.

Putting the matter in other words—when a certain distinct species of Palæozoic fish reached the amphibian phase it was still the *same* species. When it reached the reptile phase it was still the same species which had merely now reached the reptile phase, and so on, till finally it reached the bird or the mammal phase. The mere fact of a given fish species advancing

to the amphibian phase, for instance, has not made it another species.

There has been no "divergence" anywhere along the line of advance, of any one species of fish, or amphibian, or reptile, or bird, or mammal, into any other distinct species of fish, or amphibian, or reptile, or bird, or mammal.

The fact that species have passed through these several definite morphogenic phases probably has given rise to the idea of the derivation of species from other species by "divergence".

There has been no "divergence" by "spontaneous variations" into distinct types, such as the Equidæ, Bovidæ, Canidæ, Felidæ, Quadrumana, Homo, etc.

If progressive development depended upon mere "spontaneous variations" or "sports", it would be a matter of pure *chance* whether a given fish species was going to evolve into a bird or a mammal—an ostrich, an eagle, a horse, a zebra, lemur, monkey, or ape. Indeed, it would be a matter of pure chance whether it evolved into any of these types, or into something that was neither of these—neither bird nor mammal.

No organic type is "casual" or the result of "spontaneous variations". The Darwinian theory rests upon a most insecure basis, as will be pointed out in succeeding chapters. It should be remembered that the assumptions upon which the Darwinian theory rests have never been seriously examined or questioned. The division between species is vertical—not horizontal. The Darwinian idea is that separate species separated horizontally—in different strata of time as it were—whereas species are separate *ab initio* throughout all time. In other words, species have not been evolved along "divergent lines" from

a common ancestor, but along "concurrent" lines from separate ancestors *ab initio*.

Since every organism possesses a definite form, which is determined by definite chemical substances, the specific chemical constitution of species must have changed progressively from phase to phase, as they have advanced from fish to amphibian, reptile, bird, and mammal.

That is to say, these definite progressive morphogenic phases have been determined by definite progressive chemical phases in the specific chemical constitution of species.

That organisms possessing chemical affinity will all follow definite progressive phases of structure seems to be the only explanation of the "world-wide mutations" in simple *marine* types observed and remarked upon by Darwin and others.

In this connection Darwin (in *Origin of Species*) says: "It is indeed quite futile to look to changes of climate, currents, or other physical conditions as the cause of these great mutations in the forms of life throughout the world under the most different climates. We must, as Barrande has remarked, look to some special law." This law could only be "definite morphogenesis" — not "divergence" by "spontaneous variation" and "natural selection".

We see this same definite progressive morphogenesis in organisms possessing chemical affinity operating on a wide scale in the fishes of the Carboniferous epoch, which, while still of the ganoid types of the earlier Devonian epoch, had attained a *more reptilian character* than their Devonian ancestors, and were thus gradually approaching the definite reptile phase which they later attained as the true reptiles of the Permian epoch.

How definite have been the progressive morphogenic phases in the fish species of the Devonian epoch is seen in the fossil fishes *Bothriolepis* (recently discovered in Scotland), which were only able to develop into reptiles of the turtle type.

Others, no doubt, there were which could only develop into reptiles of the tortoise type, others only into reptiles of the serpent type, lizard type, crocodile type, and so on.

This would explain the "absolute breaks" between the crocodile, lizard, tortoise, and serpent types remarked upon by Huxley when he said: "The existing fauna shows us crocodiles, lizards, snakes, and tortoises; but no connecting link between the crocodile and lizard, nor between the lizard and snake, nor between the snake and the crocodile, nor between any two of these groups. They are separated by absolute breaks. If, then, it could be shown that this state of things had always existed, the fact would be fatal to the doctrine of evolution." Huxley was mistaken here.

If there had been so-called "connecting links" between any of these reptile types, they would not have been "connecting links" at all, as supposed by Huxley, but *intermediate* and *unrelated* "composite types" (referred to further on).

Nor is the fact that such intermediate "composite types" never did exist "fatal to the doctrine of evolution", but it certainly is so to the doctrine of "connecting links" and "common parentage".

Since only certain specific types of Permian reptiles could develop into birds, and others only into mammals, there is likewise an "absolute break" between the bird and mammal classes. There never could have been any "connecting link" by "divergence" from

a "common ancestor", since birds and mammals have been separately derived from specific types of Permian reptiles.

This is the only explanation of the trenchant difference between birds and mammals, seen in the hair-covered bodies of mammals and the feather-covered bodies of birds, besides many other fundamental differences.

There can be no more striking evidence of definite morphogenesis (physico-chemically determined) than the fact that practically all mammals have retained the teeth inherited from their reptile ancestors, while not a single bird has retained the teeth of the reptile. Crystal structure could not be more definite.

The differences between birds and mammals are so important and characteristic that we may assume with confidence that they have been derived from chemically and structurally specific groups of Permian reptiles, and these from specific groups of freshwater fishes, right away back to original protoplasm.

Merely because birds and mammals both possess the widely generalized "amnion" structure, Haeckel supposes that birds and mammals must therefore be "divergent" branches from some "single blood-related amniote stem-form"!

The generalized amnion structure no doubt was an *adaptive* structure quite *separately* acquired by distinct groups of the oldest reptiles—the proreptilia—from which birds and mammals have been separately derived. There could thus have been no "single blood-related amniote stem-form" for birds and mammals, as supposed by Haeckel.

It seems to me that we may as well suppose a "single-blood-related marsupial stem-form" for all the diversified Australian and South American marsupials,

or a "placental stem-form", or a "four-chambered heart stem-form", or "vertebrate stem-form", to account for the presence of all these *separately acquired adaptive* structures in a wide range of distinct orders and classes.

Yet it is mere "structural resemblance" of this kind upon which Haeckel bases his belief in "phylogenetic stem-forms" when he says: "If we accept the general theory of evolution, we are bound to admit the monophyletic hypothesis of the descent of all mammals (including man) from a single mammalian stem-form"! (*The Evolution of Man.*)

Haeckel's view, of course, is a literal interpretation of the Darwinian idea of "common parentage" based upon mere "structural resemblance", for the rejection of which idea I believe that the "general theory of evolution" would be the better.

Under Haeckel's "monophyletic hypothesis" we are committed to the serious belief that the whole kaleidoscopic mammal class has descended from a "single mammalian stem-form"!

The "stem-form"—"bifurcation"—"divergence" and "collateral" ideas, which all imply "divergence" by closely linking intermediate varieties, are not borne out by the evidence either of the Palæozoic rocks or of the present time.

Since each organism possesses a definite form, which is determined by definite chemical substances, the classification of "species" and "genera" by "structural affinity" is at bottom classification by "chemical affinity".

Species, genus, and order are merely groups of unrelated organisms having differing degrees of chemical affinity, and classified accordingly, no matter in what quarter of the globe they are found.

Such is the specificity of chemical constitution in organisms that there is a specific chemical constitution of the genus, within which there exist specific differences in the chemical constitution of each species of the genus.¹

These differences are reflected in the same degree in differences of structure, colour, etc., in the various species of the genus. For instance, the horse, zebra, quagga, ass, etc., all have a genus character, within which there are individual differences which distinguish the species from each other.

That there is even a wider specificity of chemical constitution, extending to the class, is seen in the fact that there is a specific difference between the red blood cells of birds and mammals, shown also in the fact that certain bacteria of disease attack only birds and not mammals, while others attack only mammals and not birds.

Chemical differences also exist in the nitrogenous waste products excreted by mammals and birds—mammals excreting urea and ammonia, while birds excrete uric acid—determined apparently by the form of the integument in which the embryo has to live.² These differences cannot be explained by the theories of “common parentage” and “natural selection”.

Type Inherent in the Organism

It has been pointed out at the close of Chapter I that adaptive modification of the embryo is confined to the modification of organs only, and cannot create type.

For example, adaptive modification has produced,

¹ Loeb in *The Organism as a Whole*, chap. iii, p. 64.

² Dr. J. Needham in *Science Progress* (April, 1929).

in such types as the arthropoda, mollusca, and fishes, organs *used for the same purposes* yet which *very greatly differ in each of these types*, showing that organs produced under the stimulus of use for the same purposes have to conform to type. They do not make the type.

Nor can "environment" create type, or even modify organs, except in so far as it may cause change of habit and therefore *changed use* of organs. Air-bladders, for instance, become modified into lungs when used for breathing air.

Environment has only *indirectly* (by changed use of organs) caused the adaptation of organs to tree-climbing in practically all the mammalia (and even the beetles) inhabiting the forests of Brazil.

It is neither environment nor adaptive modification of organs that has made the octopus a mollusc and the shark a fish in type. Were type to have been a matter of environment and use of organs, we should find all marine organisms either mollusca or fishes. The same holds good of all organisms and all environments. Definite morphogenesis in organisms takes place regardless of environment.

All things the world which fill
Of but one stuff are spun.

And because from this stuff nature has fashioned many things upon a more or less similar fundamental plan, this general similarity is assumed to indicate that all living things have descended—in Darwin's own words—"from some one primordial form."

Thus the old error of the "immutability of species" has given place to one in an opposite extreme.

The Existing Protozoa

If, as the Darwinian theory implies, all life has originated from the same single-cell progenitor, there should by this time no longer be found single-cell organisms.

The single cell being the *first stage* of all organic life, it is not likely that the existing Protozoa are species which have remained in their first stage from the dawn of life, while millions of others have advanced to the higher and highest forms of to-day.

Some writers, for quite good reasons, have claimed immortality for all uni-cellular organisms. If, then, the existing species of Protozoa are to be regarded as consisting of "immortal" individuals, whose structures have remained unchanged from the dawn of life, we need no stronger proof of their *distinct* physico-chemical origin from that of all the higher "mortal" organisms—overwhelming evidence of the polygenic origin of species.

"It has been pointed out repeatedly that the remarkable monera which now play so important a part in biology as *Bacteria* stand, in many respects, quite apart from the ordinary vital phenomena of the higher organisms." (Haeckel's *The Wonders of Life*.)

How, then, shall we reconcile these fundamental differences in their "vital phenomena" with "common parentage" between these elementary organisms and "the higher organisms"?

He points out, further, that "These structureless plasma bodies show unmistakably that their vital activity is a purely chemical phenomenon". (Ibid., p. 68.)

If the existing *Protozoa* have all been derived from the *same* single-cell progenitor, why such a multitude

of *distinct species* though still all in the single-cell *first stage*?

Does not this point to a specificity inherent in protoplasm itself?

Was it not by this early specificity that nature has barred the door against indiscriminate intercrossing and confusion of type?

Does not this early specificity explain the absence of all evidence of closely linking intermediate varieties either in the Palæozoic rocks or at the present time? If species have been derived from other species, this evidence should exist throughout all geological periods—*whereas it exists in none*.

The stock reply to these difficulties of the Darwinian theory of "common parentage" is that such "simple forms" as the existing *Protozoa* are "survivals unchanged" due to millions of years of "uniformity of environment". It is not clear how the multitudes of "higher forms" have escaped from a similar fate under the same conditions. Of course, there is no such thing as "uniformity of environment" for millions of years.

After lengthily reviewing the wide range of environmental influences ceaselessly acting upon organisms in all geological periods, Spencer goes on to remark: "We see that climatic variations that are geologically produced are compounded with those which result from slow astronomical changes, and as there is no correspondence between the geologic and astronomic rhythms, this astounding result follows, that the same combination of actions never recurs. Hence the incidental forces to which living things are exposed are ever passing into unparalleled combinations."

Thus we see that nothing is constant but *change*, and there is no such thing as "uniformity of environ-

ment" for millions of years, so that the stock explanation thus accounting for the presence of the existing *Protozoa* is really no explanation at all.

But even if the conditions of environment could remain indefinitely the *same*, mere "environment" can neither retard or hasten definite morphogenesis in organisms.

As a matter of fact, it has been experimentally demonstrated in the case of such simple *Protozoa* as the existing *Bacteria* that structural modification takes place regardless of environment.

So that there is left no ground upon which to rest the stock explanation of "survival unchanged" to account for the presence of the existing *Protozoa*.

It would be no explanation to say that "low forms are slow to change", for if all living things have arisen from the *same* single-cell progenitor, as the Darwinian theory implies, it would not explain why countless forms, just as "low" when they all began, have in the same length of time advanced to the higher forms of to-day.

Primitive Plant Types

In the vegetable kingdom we find to-day side by side with the highest types many so-called "primitive" types of plants, such as Algæ, Mosses, Lichens, Sigillaria, Ferns, Palms, Cycads, and Conifers, which are regarded as "survivals unchanged" of ancient species flourishing in early geological periods.

No good reason has ever been shown why these particular species should have "survived unchanged" from a remote epoch.

The existing species are far more likely to be later

evolutions, evolving along concurrent lines to those of the extinct species of the Palæozoic epoch, whose descendants are now the higher types.

Existing Horse Types

The horse kind, at a comparatively recent geological period, became entirely extinct in the New World, thus leaving no descendants at all.

It is most improbable that the existing horse kinds of the Old World have descended from any New World ancestors. Yet the supposed "ancestor" of the Old World horse existed in the New World only! It appears to have been a small creature about the size of a rabbit, with four hooped toes on each foot.

Moreover, the now extinct horse kind of the New World consisted of entirely distinct species from any existing Old World species. When, too, we consider that of the numerous fossil remains of hooped animals one was only the size of a rabbit, and found only in the New World, some resembled tapirs, others the rhinoceros and tapir as much as the horse, it becomes evident how little certainty there is that any one of the many fossil forms as yet found is that of an actual ancestor of any of the existing Old World species of horse, zebra, quagga, ass, etc.

The progressive modification in the bones of the hoof shown by Huxley were arrived at, apparently, by comparing the fossil remains of unrelated hooped animals of the Old and New Worlds. So that though these progressive modifications are usually supposed to be those of the hoof of the actual "ancestor" of the existing Old World horse, they really amount to nothing more than evidence of *definite progressive modifications*

in the bones of the hoofs of *many unrelated* hoofed animals in both the Old and New Worlds.

These progressive modifications afford, more than anything else, illuminating evidence of the modifying influence both of *use* and *disuse* in the development and disappearance of organs.

The central great toe, being the one chiefly used, has become more and more developed, while the smaller toes on each side of it, being less and less used, have become less and less developed under disuse until these have finally disappeared, and are now in the existing horse kinds merely represented by small bony ridges on each side of the leg bone, which was once the bone of the central great toe and now terminates in the single hoof.

The striped markings, too, which crop up in the hybrids between certain species of the existing Old World horse kind, and supposed by Darwin to denote "common ancestry", most probably indicate that striped markings were common to the *unrelated* ancestors of the species crossed.

Striped markings very similar to those of the zebra are seen even in the unrelated (cloven-hoofed) okapi of Central Africa.

Unrelated Structural Resemblance

The late Professor Mivart has pointed out that, "Where organs are wonderfully alike in groups widely separated, the resemblance between the organs cannot be due to descent from a common ancestor." (*An Easy Outline of Evolution*, by Dennis Hird, M.A.)

The biological importance of Professor Mivart's objection has been lost under the obscuring influence of the Darwinian theory.

The force of Professor Mivart's objection is, however, gradually becoming recognized, for, says Professor William King Gregory, "*According to what may be called the orthodox view, all resemblances between vertebrates and arthropods have been independently acquired in these two great groups . . .*"¹ (*italics mine*).

The above admission, of course, is absolutely fatal to the Darwinian theory of "common parentage" based upon mere "structural resemblance".

Structural resemblance cannot very well be taken as denoting "common parentage" in some groups, and "*independently acquired*" in others, in order to meet the exigencies of the Darwinian theory.

We must therefore conclude that resemblances between the species of *all* groups—whether genera, orders, or classes—have likewise been "*independently acquired*" by each species of the group, and have nothing to do with "common parentage".

For instance, take the species of the order Primates. The little aye-aye of Madagascar is a lemur resembling a large squirrel, with teeth resembling those of a rabbit. Compare the little aye-aye with the slender lori—a *tail-less* lemur of Ceylon. Both these species are "lemurs" belonging to the order Primates, yet they differ so greatly in general structure that their "lemur" characters must have been "*independently acquired*" and have nothing to do with "common parentage". This holds good of "structural resemblances" between the species of all groups—whether genera, orders, or classes.

Among the many instances of "organs wonderfully

¹ Professor William King Gregory in *The Lineage of Man* (The Macmillan Company, New York).

alike in groups widely separated " are (1) the Vertebral Column, (2) the Amnion, (3) the Placenta, (4) the Mammary Glands, and (5) the Four-chambered Heart, all of which are distinctly adaptive structures, *separately acquired* (under adaptive modification of the embryo) by great numbers of species in " groups widely separated ".

These structures, therefore, notwithstanding their resemblance, cannot possibly have been inherited from a " common ancestor " by the diversified groups in which they are found, so that they are merely *unrelated structural resemblances*.

Other instances of " organs wonderfully alike in groups widely separated " are discussed by Darwin himself as follows : " The presence of luminous organs in a few insects belonging to different families and orders offers a parallel case of difficulty. . . . The electric organs offer another and even more serious difficulty, for they occur in only about a dozen fishes, of which several are widely remote in their affinities. . . . If the electric organs had been inherited from one ancient progenitor thus provided, we might have expected that all electric fishes would have been specially related to each other." These are Darwin's words !

The only explanation of these " difficulties " seems never to have occurred to Darwin's mind. These and kindred difficulties meet us at every turn in the " common parentage " theory—difficulties, in fact, which do not exist but for that theory.

Under the theory of the polygenic origin of species there is no difficulty in accounting for so-called " aberrant species ", mammal fishes, weird mammal forms such as the armadillo, walrus, seal, narwhal, manatee, and dugong—a reptile-like bird (archæ-

opteryx), and a bird-like reptile (pterodactyl)—all irreconcilable forms under the “common parentage” theory.

The notochord, possessed by such “widely separated groups” as Amphioxus, Ascidian, and Balanoglossus, may offer examples of the progressive “steps” through which the vertebral columns of all vertebrates have separately passed, but this cannot in the very least prove that the notochords of the lowly forms named, and the vertebral columns of all vertebrates, have been inherited from a “common ancestor”.

In the notochord and vertebral columns we have striking examples of adaptive modification of the embryo under the stimulus of *use* resulting in the development of *like* organs in unrelated and extremely *unlike* organisms for meeting a pressing need common to all—that of a stiffening yet flexible core to a flexible body requiring to accommodate itself to ever-changing inflections.

Composite Types

The so-called “connecting links” are in reality “*disconnecting links*”, that is to say distinct types *intermediate* between the groups they resemble and related to neither—proofs of *separate* and not of “common” parentage.

The term “connecting link” tends to convey the erroneous impression that they are “links in the chain of descent” and therefore connected by descent with both the groups they resemble—a misconception fostered by the fallacy of “common parentage” wherever “structural affinity” exists.

The misconception underlying the “connecting

link " idea will perhaps be better appreciated by taking as a typical example the fossil form palæotherium, which in its structure resembles both the rhinoceros and the horse types.

It is plain that palæotherium could not have inherited his composite character from two distinct ancestors—rhinoceros and horse—which proves that he has inherited it from neither. He could only have inherited it from an ancestor of *composite* character like himself.

Where then did that ancestor get his composite character from? From an earlier ancestor no doubt also possessing a composite character—and so on, right back to primordial protoplasm, which must have possessed a composite chemical character. "Each organism is characterized by a definite form which is determined by definite chemical substances," says Professor Loeb.

Conspicuous among existing "composite types" are the Hyracoidea, an interesting family of mammals, whose "structural affinities" are so many-sided that they puzzled zoologists to know where to place them. They were at first placed among the *Rodentia*. Later they were removed to the *Ungulata* and given a place near to the genus rhinoceros.¹

Further investigation caused them to be once more removed, but this time to their right place—entirely by themselves!—where they really belong as *distinct* "composite types" from the beginning.

As in the case of palæotherium and all other "composite types", the Hyracoidea could not have descended from ancestors of both rodent and ungulate types, which proves that they have descended from

¹ *Encyclopædia Britannica*, 9th edition.

neither. Their rodent and ungulate affinities have nothing to do with relationship to either of these types.

This applies to all the "composite types" (so-called "connecting links") existing and extinct. There are many extinct "composite types" in the New World, conspicuous among which is the megatherium, a composite Edentate sloth. There is also the anoplotherium, a composite pig-hippopotamus, a composite seal-whale, and a composite beaver-sloth, etc.

The biological significance of the "composite types" is that they show that all the species of a genus are merely *unrelated repetitions of a type*.

The origin of "composite types" can only be traced to and sought in protoplasm—*nowhere short of protoplasm*. They are utterly inexplicable by the Darwinian theory of "common parentage", while they are automatically explained by the theory of the polygenic origin of species—of which they furnish proof.

It is important to discriminate between "transitional forms" and "composite types", to which it may be perhaps as well here to refer in terse detail:—

(A) *Transitional Forms*.

Intermediate between *two distinct zoological classes* such as between—

Fish and Amphibian.

Dipnoi (mud-fish of Amazons and Australia).

Amphibian and Reptile.

Aquatic Salamanders (existing).

Reptile and Bird.

Archæopteryx (extinct).

Reptile and Mammal.

Ornithorhynchus (existing).

(B) *Composite Types.*

Combinations of two distinct types within the *same zoological class*, such as between—

Two Mammal Types.

Rhinoceros-Horse (Palæotherium, extinct).

Two Bird Types.

Buzzard-Polybori (Galapagos Hawk, Chapter IV).

(C) *Anomalous Composite Types.*

Combinations of two types in *distinct zoological classes* between which there can be no “transition” from the one class to the other, such as between—

Bird and Mammal.

Ornithorhynchus.

Plant and Animal.

(1) Tunicata.

(2) Sponges.

Ornithorhynchus paradoxus

This animal, true to its name, is not alone the nearest existing “transitional” form between reptile and mammal, but is also an anomalous combination of bird and mammal, for it has a beaver-like body and tail with the beak of a duck, lays eggs, hatches them, and suckles its young! This anomalous combination of types between which there can be no “transition”, proves that it is not related either to the mammals or the birds.

The Tunicata

The ascidians are “anomalous composite types” having characters common to both plants and animals,

which proves that they are not related to plants or animals.

Outwardly they resemble plants far more than animals. They are the only (so-called) animals which, like plants, secrete cellulose, forming a tough leathery outer covering of woody matter over the body, like the bark of plants. This cellulose is exuded by the epidermal cells of the ascidian. The epidermal cells of no true animal possess the chemical constitution enabling them to exude cellulose. Only vegetal cells possess this chemical power, which shows that the ascidians are not true animals. Neither are they true plants. Like plants they are stationary, attaching themselves to submarine objects such as stones, etc. Like self-fertilizing plants, too, they are self-fertilizing—male and female in one.

Yet these anomalous organisms possess features characteristic of the animal as well as the plant. For instance, they possess a heart which is of a simple tubular form. The pulsation of the ascidian's heart, however, is *entirely different from that of all true animals*.

“This simple heart of the ascidian,” says Haeckel, “has a remarkable peculiarity. It contracts in alternate directions. In all other animals the beat of the heart is always in the same direction (generally from rear to front); it changes in the ascidian to the *reverse direction* . . . the two large vessels that start from either end of the heart act alternately as arteries and veins. This feature is found in the tunicates alone.” (*The Evolution of Man.*)

The very important difference between the heart-beat of the ascidians and that of all true animals is sufficient proof that the ascidians are not true animals. Though they possess certain features in common with

both plant and animal, they are in certain other respects *absolutely distinct* from either true plants or true animals, and cannot be related to any class of either animals or plants. They are utterly inexplicable by the Darwinian theories of "common parentage" and "natural selection", while they are automatically explained by the theory of the polygenic origin of species.

Mere resemblance in the "embryonic development" of amphioxus, ascidian, and vertebrate is the basis of Haeckel's belief in the "common ancestry" of all these widely separated classes!

We should expect to find that "embryonic development" would run through much the same definite progressive phases in all organisms, which by adaptive development have gradually acquired the *chorda dorsalis* or vertebral structure (whether amphioxus, ascidian, or vertebrate)—whether related or not.

"Where organs are wonderfully alike in groups widely separated, the resemblances between the organs cannot be due to descent from a common ancestor," as pointed out by Professor Mivart.

The general *retrogressive metamorphosis* of the adult ascidian furnishes most instructive evidence of the potent influence of *use* in the development, and *disuse* in the degeneration of organs. This is seen in the fact that during its life as a tadpole-like, free-swimming larva, it possesses a fuller development of the *chorda dorsalis*, brain, and sense-organs, than it does in its stationary adult stage, in which these organs have degenerated under *disuse*.

It is plain that during its life as a free-swimming tadpole-like larva, constantly swimming about in the sea by means of its rudder-like tail, seeking food, it is all the time bringing into constant *use* its *chorda dorsalis*, heart, brain, and sense-organs.

All these organs (except the heart, which continues in full *use*) begin to degenerate under *disuse* when, later, the free-swimming larva sinks to the bottom of the sea, discontinues its locomotive habit by attaching itself to stones at the bottom of the sea, and henceforth lives a *stationary* life enveloped within a *rigid covering* of woody matter, thereby dispensing with any need of a stiffening *chorda dorsalis* as a support to its upright-standing body. The heart, however, as the organ continued to be *used* in the adult ascidian, does not degenerate.

That this degeneration of organs in the adult ascidians (in the larger species) is entirely due to *disuse* in their stationary stage, is seen in the smaller species of tunicates in which there are free-swimming forms which never become stationary, and in consequence the *chorda dorsalis* remains fully developed under constant use throughout their lives.

Since then "each organism is characterized by a definite form, which is determined by definite chemical substances", the origin of these "anomalous composite types" can only be explained by an anomalous composite chemical constitution in primordial protoplasm.

Finally, it is well to bear in mind that such stock Darwinian phrases as "connecting links"—"allied species"—"allied genera"—"sub-species"—"geographical races", and the grouping together and classification of a wide range of diversified forms such as the Arthropoda, Mollusca, Crustacea, Vertebrata, and Mammalia, because of their possession in common of certain structural peculiarities or "affinities", is no proof of "common parentage" between any of the members of such groups or classes.

CHAPTER III

CONTINENTS AND ISLANDS

No doubt there have been throughout the ages in all the continents many great oscillations of level, in the form of local elevations, subsidences, and submergences. But I believe that the general outlines and relative positions of the existing continents have not materially changed since their elevation.

I do not believe that there is sufficient evidence for the usual ideas of widespread sunken continents and "former connections" between continents and islands.

Edward Forbes, for instance, is said by Darwin to have believed that "all the islands in the Atlantic must have been recently connected with Europe or Africa, and Europe likewise with America. . . . Other authors have thus hypothetically bridged over every ocean, and have united almost every island to some mainland!"

Even Darwin, whose theories have to assume too many "former connections", deprecated this wholesale submergence of hypothetical continents, whose "fragments" are supposed now only to remain as remotely isolated islands scattered round the globe!

In this connection Darwin makes the following much needed comment—"but to the best of my judgment we are not authorized in admitting such enormous geographical changes within the period of existing species. It seems to me that we have abundant evidence of great oscillations of level in our continents, but not of such vast changes in their position and extension as

to have united them within the recent period to each other, and to the several intervening oceanic islands."

Supposed Sunken Continents

With regard to the prevailing tendency to do so, it is, I think, a mistake to regard all submarine plateaux lying between two continents, or two islands, or between a continent and an island, as necessarily always *sinking* plateaux, the remains of "former connections". They are just as likely, if not more likely, to be gradually *rising* or even stationary plateaux which have never yet been above sea-level.

Such submarine connecting plateaux would be more likely to be found *between* regions already elevated above sea-level, such as continents and islands. The beds of the oceans are themselves a succession of heights and hollows of varying depths—submarine mountains, in fact, which have never yet been elevated above sea-level.

The finding of animals, or fossilized remains of animals, of similar genera on continents or islands between which submarine plateaux exist, is in itself no proof of "former connection" between such continents or islands. Genera closely resembling one another are found in the most widely separated regions.

The persistence of the "former connection" idea wherever islands are found within the same ocean shows itself in the tenacity with which the "Lost Atlantis" legend continues to subsist upon a diet of pure speculation, based chiefly upon the existence of what is known as the "Central Atlantic Rise".

The top of this S-shaped submarine mountain range lies about 9,000 to 10,000 feet below the surface of the

ocean. On each side of this ridge the floor of the Atlantic sinks into valleys about 15,000 to 17,000 feet below the surface of the ocean.

Because the islands of the Azores, St. Paul, Ascension, and Tristan da Cunha are the highest peaks projecting above sea-level, these islands, it is thought by some, may be the only remaining portions of the legendary lost continent of Atlantis referred to by Plato (as a legendary continent)—“larger than Libya and Asia put together”—and supposed to have existed to the west of Europe opposite the Pillars of Hercules (Gibraltar) and said to have disappeared beneath the sea—“in a single day and night.”¹

It is, of course, highly improbable that a vast continent, “larger than Libya and Asia put together,” could have disappeared beneath the sea “in a single day and night”. There is here the characteristic extravagance of the “legend” pure and simple.

When part of the Atlantic floor has been found to rise $2\frac{1}{4}$ miles during an interval of twenty-five years, and new submarine mountains constantly appear on the bed of the Atlantic, when plateaux sink and deeps become plateaux, when pieces of lava showing signs of irruption on dry land have been brought to the surface on Dolphin's Bank some 500 miles from the Azores, these things appear to indicate that the floor of the Atlantic is a region of constantly oscillating submarine plateaux, and has never been the site of a vast and stable continent standing above sea-level.

Long before Columbus accidentally came upon America there had been vague rumours of the existence of land to the west of the isle of St. Brandon, and a mysterious land called Brazil. Some early knowledge

¹ C. Mackenzie (*New York Times*).

of this land most probably was the basis of the legend of the lost continent of Atlantis.¹

Instead of supposing, as some do, that the owl-headed vases of Peru and Greece and the round towers of New Mexico and Ireland had originated in a now engulfed Atlantic continent, and spread from there westward to Peru and New Mexico and eastward to Ireland and Greece, it is far more probable that a knowledge of this pottery and architecture had, at some early period and by some unknown means, come direct from America to Europe.

As further evidence of the persistence of the hypothetical "sunken continents" idea, we find that because there is a structural resemblance between the femurs of the Aborigines of Australia, Andaman Islanders, and the Bushmen of South Africa, it has been supposed by some that these primitive races are the descendants of a common primeval stock which once inhabited a now sunken "Indo-African Continent" !

The fact that the South African Bushmen have "wool", while the Australian and Andaman Islander have "hair" on their scalps does not appear to affect this "Indo-African Continent" idea.

It is highly improbable that any huge mass of land like a continent, once elevated above sea-level, would sink and entirely disappear beneath the surface of the sea as is supposed. The tendency would rather be the other way.

As the globe cooled its circumference was bound to shrink, and the solid crust beneath the universal waters would be bound to crumple upwards in some parts of it, thereby thrusting portions of the crust upwards above the level of the waters. Thus the

¹ Cassell's *Book of Knowledge*.

foundations of the existing continents and large islands were laid.

This upthrusting of a considerable portion of the earth's crust above the waters would cause a deepening of the waters resting upon the unelevated portions of the crust. The pressure of deep water upon the earth's crust beneath it is terrific and much greater than that exerted upon it by solid masses of land.

That land surfaces are the regions of least pressure upon the earth's crust is seen in the prevalence of volcanoes upon the land where the upthrust of matter from beneath finds the easiest escape. Generally speaking, therefore, there would be a tendency for continents to *continue rising* (not sinking) under the bulging upward of land surfaces due to the enormous pressure of deep oceans upon the earth's crust between the land masses, as well as to shrinkage in the earth's circumference.

Further evidence of the persistence of the sunken continents and "former connections" idea is seen in the following. Merely because some bones of a kangaroo-like marsupial, about the size of a rat, have been recently discovered at Alexander Bay (South-Western Africa) the theory is being put forward that this is evidence that Africa was at one time connected with South America and Australia !

The groundlessness of this theory becomes evident when it is remembered that the indigenous mammals of all continents and islands must have independently passed through the Monotreme and Marsupial phases.

The mere fact, therefore, that marsupial remains are found in Europe, South America, Africa, and Australia affords no evidence whatever that these continents were all connected during the Jurassic period or any other period.

Moreover, the utter dissimilarity between all the indigenous mammals of South America and those of Africa affords overwhelming evidence that these two continents never have been connected. The Pangean theory of their "former connection" is untenable.

As in the case of the Atlantic Ocean, so in the case of the Indian Ocean, the "Sunken Continent" and "Former Connexion" idea continues to subsist upon a diet of pure speculation.

Now, in the first place, every existing continent affords abundant evidence of continuous gradual elevation of the whole land mass above sea-level, while there is no evidence whatever of either gradual or sudden submergence of the whole land mass.

Yet the "sunken continent" and "former connexion" idea continues to "bob up serenely" from time to time quite undisturbed by the absence of any kind of direct proof, such as the finding of fossilized remains of land life upon the supposed site of the supposed sunken continent.

This time it is in the Indian Ocean. A report has been going the rounds of the South African Press of the recent discovery in the Indian Ocean of a submarine mountain range 10,000 ft. high, with its top 1,000 ft. below the surface of the sea, which is supposed to be evidence of a "sunken continent" in the Indian Ocean. Since the floors of the oceans consist of a succession of submarine ridges and valleys of varying heights and depths, why should this one more than others be evidence of a "sunken continent"?

The existence of a submarine mountain range in the Indian Ocean can be no more proof of a sunken continent in the Indian Ocean, than is the submarine "Central Atlantic Rise" proof of a sunken continent in the Atlantic Ocean.

In the report referred to reference is made also to a purely hypothetical "former connexion" between Africa, Madagascar, and India, which has been christened Gondwanaland. The chief reason for supposing the one-time existence of this hypothetical "former connexion" is said to be "resemblance" between the animals of Africa, Madagascar, and India.

Now, not alone are the indigenous animals of Africa, Madagascar, and India entirely different, but the aboriginal species of mankind found in these countries are altogether different! But even supposing that the indigenous animals and aboriginal species of mankind found in these countries really did resemble each other, the chief reason for supposing the "former connexion" between these countries would, even then, be based upon the old fallacy that mere resemblance always proves "relationship".

The same thing is seen in the continents bordering upon the Atlantic Ocean. Not only are the indigenous animals of the two Americas, Africa, and Europe entirely different, but the aboriginal species of mankind found in these countries are also entirely different. These facts are definitely against any theory of "former connexion" between America, Africa, and Europe, as is supposed.

With further reference to the "sunken continent" idea, it may be here incidentally remarked that the land mass at the South Pole, for instance, is probably quite one of the oldest land masses upon the globe, yet, heavily loaded with mountains of perpetual ice, it has not sunk beneath the surface of the sea.

The Existing Continents

I believe that the existing continents are the only continents that ever have existed, but that they are not all equally ancient. Judging from the general standard of development of their indigenous fauna and flora, it is probable that Europe, Asia, and Africa are the oldest continents, North America younger than these, South America younger than North America, and Australia younger than South America.

Notwithstanding the fact that Laurentian rocks are found in North America, the further fact that the "existing productions" of North America are said to more closely resemble those which lived in Europe during certain later Tertiary periods than those now living in Europe, indicates that North America is younger than Europe.

Though the Laurentian rocks consist of early marine deposits metamorphosed by internal heat, I do not see that it necessarily would follow that the Laurentian systems of all continents in which they are found have been elevated during the same period.

Moreover, the rock systems of the different continents and islands, with the organic forms they contain, have probably (*independently and at different periods*) each passed through the same definite series of changes. So that the Permian system of one continent may not be as old, in point of time, as the Permian system of another, although the Permians of both may contain fossil forms in the same stage of development—for instance, the Permian systems of North America and Europe. So with the Carboniferous systems of polar and equatorial regions. They are probably not equally old.

The land surfaces nearest the poles must have been the first to become cool¹ enough for life to begin from

¹ Owing to the obliquity of the sun's rays at the Poles and consequently the greater escape at the Poles of internal heat into the cold of outer space than takes place at the equator.

protoplasm, while the land surfaces nearer the Equator will, at a much later period, have reached a stage cool enough for life to have begun upon them. So that the Carboniferous systems, for instance, of the land surfaces near the poles must have been laid down at a much earlier period than those of the land surfaces nearer the Equator.

Notwithstanding the disparity in point of time between the Carboniferous systems of regions near the poles and those nearer the Equator, the types of the fossil flora and fauna of both would probably be found to be in much the same stage of development.

Referring to the existing continents, Sir J. D. Hooker, in his address to the Royal Society in 1877, commenting upon Count Saprota's theory of diffused sunlight and internal heat as accounting for the tropical aspect of the former vegetation of polar regions, remarks as follows: "Then there is no necessity for assuming . . . that the position of the poles was altered to account for the high temperature of pre-Glacial times in high northern latitudes; or, lastly, that the main features of the great continents and oceans were very different in early geological times from what they are now."

The phrase "early geological times", of course, covers an enormous vista of time. However, the marked *regional distribution* of specific types of animals and plants found indigenous to *certain continents and islands only* affords strong evidence that, at any rate from the period at which primordial protoplasm first began to be evolved in the warm waters of the internally heated land surfaces, the relative positions of the great continents and oceans have been, as suggested by Sir J. D. Hooker, "not very different from what they are now."

Land Animals probably Freshwater Origin

The earliest forms of life (plant and animal) were probably evolved from protoplasms of marine origin and before the appearance of any land surface above the face of the primordial waters encircling the globe, after the crust had become solid and cooled enough to allow water to rest upon it without rising in steam as soon as it had fallen.

The protoplasms from which land life was evolved probably originated under freshwater conditions upon the land surfaces elevated at a later period above the face of the oceans, over which hung a dense canopy of perpetual cloud through which the sun's direct rays never penetrated. Even with the sun at its zenith overhead, a warm, steamy atmosphere and murky twilight brooded over the face of land and ocean.

Under the constant radiation of internal heat of an electrical character, there was no need for strong and direct sunlight. No marked summer and winter seasons. An intensely humid atmosphere prevailed, with heavy precipitation.

Notwithstanding the incessant and heavy precipitation of early geological times, long-standing bodies of water, drained off the land surfaces of the region, owing to being impregnated with the chemicals in the soil would have become only relatively "fresh", and could thus have contained all the chemical elements necessary for the evolution of protoplasm.

Protoplasm, in common with all living things, possesses the properties of *Assimilation*, *Excretion*, *Growth*, etc. We may, therefore, reasonably infer that primordial protoplasm (owing to its power of assimilation) would have been liable to modification in its specific chemical constitution according to the

chemical character of the early rocks and their sediments at the bottoms of the warm waters of the land-locked seas and lakes of the regions in which it was evolved under an unbroken flow of internal heat for ages.

It is not likely that life could have originated from primordial protoplasm in which the chemical basis consisted entirely of compounds of the elementary substances, carbon, hydrogen, oxygen, and nitrogen in complex union, without the power of assimilating the alkaline and earthy phosphates and other minerals found to be indispensable to the cells and maintenance of life in all organisms.

The "freshwater" origin of land animals explains, as nothing else can, why it is that certain *regional modifications of type* are found in the animals of *certain continents only*, which cannot be due to "descent from a common ancestor of the region", and can only be due to modification in the chemical constitution of the "freshwater" protoplasm of the region.

For instance, the extremely *regional* character of the plants and animals of Australia and of the islands of the Australian region. The opossums, sloths, armadillos, peccaries, etc., of South America. Platyrrhine monkeys in the New World only. Catarrhine monkeys and apes in the Old World only. Lemurs in the Old World only (Madagascar is the chief centre of the lemurs). Pteropus bats are found in the Old World only. Gorillas, Negroes, and antelopes in Africa. Kangaroos and kangaroo-like types in Australia only, and so on.

If land animals had been derived from marine fishes there would not have been found so markedly *regional* a distribution of specific types. There would have been found a more general mixture and distribution of types

scattered throughout the continents and islands of the world, for oceans have no frontiers.

That land animals and plants are not of marine origin is also strikingly shown in the dissimilarity between the species of flora and fauna of the different Galapagos Islands, which lie only a few miles apart.

It is a fact of great significance that *practically all existing amphibia inhabit fresh water only* and cannot live in salt water—thus testifying to their fresh-water origin.

It is from the *amphibia*, let us not forget, that the land animals have come, and we may judge the environment inhabited by the amphibia of the past by that inhabited by the amphibia of the present.

Aquatic life may be divided into two well-defined classes—(1) *Salt-water* and (2) *Freshwater* inhabitants.

The very fact that there exists a hard and fast division between salt- and freshwater inhabitants (both plant and animal) and the fact that the inhabitants of the one environment, with few exceptions, cannot exist in the other, is strong evidence of their different origins from the beginning under fresh- and salt-water conditions. What more likely and more natural than that each class should keep from the beginning to its own distinct environment?

Significant, too, is the difference between salt- and freshwater fishes, shown in the fact that the air-bladders of all salt-water fishes contain a mixture of gases in which oxygen predominates, while nitrogen predominates in the air-bladders of all freshwater fishes.

Freshwater eels, however, afford a curious exception to the rule that freshwater inhabitants confine themselves exclusively to fresh water. The eels of Europe, it has been recently proved by

Professor Schmidt (Director of the Carlsberg Laboratory, Copenhagen), while they live in the rivers of Europe, go into the sea every autumn, cross the Atlantic, and deposit their spawn in the deep warm waters of the Sargasso Sea, near the West Indies, where they die after spawning.

When the young eels hatch they make their way to the rivers of Europe from which their parents had come. It is said that from the days of Aristotle, more than 2,000 years ago, naturalists have tried in vain to solve the mystery of the whereabouts of the breeding grounds of European freshwater eels—a mystery which has now been solved by Professor Schmidt.¹

Among fishes the salmon is also remarkable for its habit of ascending rivers from the sea at the autumn season for the purpose of depositing its spawn, and returning to the sea again in the early spring.

Here we have a curious reversal of the roles. Freshwater eels go into the sea to spawn, while an apparently salt-water fish goes into freshwater rivers to spawn.

Such exceptional cases as these, however, do not lessen the weight and significance of the general evidence of the hard and fast division between fresh- and salt-water inhabitants. Such exceptional cases really prove nothing.

In these exceptional cases the habit of temporary migration from the one environment to the other at certain seasons of the year, for the purpose of spawning, has probably been very gradually acquired in tidal rivers partaking of both salt- and freshwater conditions.

It is doubtful whether freshwater fishes could be accustomed to live in salt water, though experiment

¹ *Natal Mercury*, South Africa, 20th January, 1930.

appears to have shown that certain species of salt-water fishes can, *with care*, be gradually accustomed to living in fresh water, which again proves nothing, for no indigenous salt-water inhabitants would ever, under natural conditions, voluntarily transfer from salt to fresh water or vice versa, at any stage of their evolution.

It is doubtful, too, whether the ova of fresh-water fishes would hatch and mature in salt water. Frog spawn, it is well known, is destroyed by salt water.

Darwin has remarked that "according to Valenciennes there is hardly a single group of fishes confined exclusively to fresh water".

This, however, does not imply that there is any group of fishes indiscriminately and habitually living in both freshwater and salt-water environments. We have here merely evidence of *unrelated type parallelism* in species of salt- and freshwater origins respectively.

The *fish-form* being generally associated with the sea and not the land, and the fact that all amphibians, reptiles, birds, and mammals have passed through the *fish-form*, has given rise to the general idea that all forms of land animals have originated from fishes of the sea.

Strongest Evidence of All

The most significant facts of all, pointing directly to the "freshwater" origin of the mammalia, are the following :—

(1) The Devonian *Rhipidistia* fishes, through which the mammalian line is believed to have passed, were "freshwater" fishes.¹

¹ Dr. R. Broom's *Origin of the Human Skeleton*.

(2) The *Therapsida* (mammal-like) reptiles of the Permian and Trias, from which it is believed the mammalia have been directly derived, came through *freshwater* amphibia. No more conclusive evidence of the freshwater (i.e. land) origins of the mammalia can be required.¹

Referring to the reptilian ancestors of the mammalia Dr. Broom says : " These *Therapsids* form a group of reptiles nearly as varied as the living mammals. . . . "

Probably the varied groups of existing mammalia have been derived from as many varied groups of the *Therapsida*. These, again, from as many varied groups of Devonian freshwater *Rhipidistia* fishes. These, again, from as many varied groups of pro-Rhipidistia fishes, and so on, back to as many varied groups of primordial protoplasms possessing a basic similarity with definite differences of specific chemical constitution. No doubt only a fraction of the fossil remains of the *Therapsida* which once existed have been thus far discovered.

Dr. Broom points out that the *Therapsida* reptiles differed greatly in size. This being so, no doubt the *Therapsid* ancestors of the existing mammals differed in size just as the mammals do to-day.

It is most improbable, for instance, that the fossilized remains, found in the New World, of a little animal about the size of a rabbit or a fox, with four hooved toes on each foot, and supposed to be the " ancestor " of the modern horse, could have been derived from a *Therapsid* ancestor of the same size as the *Therapsida* reptiles from which the horse, quagga, and ass have been derived.

No doubt the *Therapsid* ancestors of the rats, for instance, were of proportionately smaller size than those

¹ Dr. R. Broom's *Origin of the Human Skeleton*.

from which the hippopotami and elephants have been derived.

The same applies to the Therapsid ancestors of the Primates, from the tiny marmosets and monkeys to the gorilla, orang, chimpanzee, and man.

Evidence of the "freshwater" origins not only of the existing mammalia, but of the existing reptiles and birds, is overwhelming. This means their origins on different continents and islands.

It is plain that the environments of freshwater lagoons, shallow freshwater lakes, and land-locked seas afford the most favourable environmental conditions for the "transition" from fish to amphibian and amphibian to reptile.

On the other hand, the ceaseless battering of ocean waves upon rock-bound coasts and sandy beaches and the constant rise and fall of the tides are most unfavourable to the transference of marine life to land life and to the "transition" from fish to amphibian.

In fact, the most ancient existing reptiles—the *Crocodylia*—are still found only in freshwater environments. Even the partly aquatic reptiles of the Galapagos Islands only go into the sea for their food (chiefly seaweed).

Indeed, it is more than significant that the only existing "transitional" forms are to-day found in *fresh water*, namely :—

(1) Fishes with characters intermediate between fish and amphibian (the *Dipnoi* of Australia and the Amazons).

(2) Aquatic salamanders with characters intermediate between amphibian and reptile.

(3) Ornithorhynchus, with characters intermediate between reptile and mammal.

The extremely *regional* individuality of the Australian fauna and flora points to their *freshwater* origin within Australia itself.

Finally, we may, I think, safely infer from the foregoing general evidence that it was from *freshwater* Palæozoic fishes that the existing amphibia, reptilia, avifauna, and land mammalia have been derived.

CHAPTER IV

THE AUSTRALIAN REGION

The remarkable feature about the indigenous animals of Australia is that they are on the whole "primitive" in type compared with those of the rest of the world.

No explanation of this extraordinary fact has been suggested beyond vague references to the "long isolation" of Australia, which, of course, is no explanation at all.

The purely hypothetical "former connection" of Australia with some supposed continent has helped to keep going the Darwinian idea that mammals have not been evolved on islands.

We owe the complete misinterpretation of the facts of Australian animal life to the deeply rooted fallacy concerning "Sunken Continents" and "Former Connexions" which never existed.

The indigenous animals of Australia are looked upon as "survivals unchanged" of ancient stocks—"living fossils" Darwin called them. But we may as well call the existing fishes, amphibians, and reptiles "living fossils", for they, too, are all "primitive" forms in the lower phases of evolution through which all the higher forms have passed.

Australia is regarded as a happily existing "natural museum" for the "preservation" of these so-called "living fossils".

Why, then, should Australia be to-day so *par excellence* the land of "primitive forms"?

Why, in fact, should Australia, with its more than

one hundred species of remarkable pouched animals, found nowhere else in the world, its "primitive" monotremes, quasi-Fringillidæ, abnormal Passeres, its Cycads, etc., *to-day* resemble Jurassic times?

There is only one explanation which can meet all these remarkable facts, and that is that *the island of Australia has been elevated above sea-level at a later period than that at which the great continents of the world were elevated.*

Hence, the indigenous animals of Australia are *later evolutions* than are those of the same zoological classes in the older continents, and they should therefore be regarded not as "survivals unchanged" of ancient species, but as animals of comparatively simple types because of comparatively later origin.

However obscure may be the geological past of Australia, its indigenous fauna and flora speak in unmistakable terms of comparatively *later origin.*

Just as the relative antiquities of the stratified rocks are judged, not by the rocks themselves so much as by the *organic* forms they contain, so should the relative antiquities of continents and islands be judged, not by their rocks, but by the *standard of development* of their indigenous fauna and flora—especially the former.

This principle, however, has not been applied in the case of Australia and other mammal-bearing islands because of the mistaken Darwinian idea that mammals could not have been evolved on islands.

Consequently, the important lesson taught by the comparatively "primitive" standard of development of the fauna and flora of Australia has been lost, and instead of being interpreted as meaning that Australia is a *large island of later elevation* than the great continents of the world, it has been assumed that,

on account of its mammals, Australia must be a "long isolated portion" of some purely hypothetical sunken continent or of some equally hypothetical now vanished "connection" with Asia or Africa. All this because of the idea that mammals could not have been evolved on islands as well as continents.

Judged by the general standard of their development, the Australian fauna belong more to the Jurassic age than the present. It is not that they have lost time on the way by "long isolation", but that they have *started late*.

Australia is sometimes referred to as "the oldest continent on the globe", no doubt because its marsupial fauna are mistaken for "the oldest mammals in existence" instead of the *youngest*—as they are.

Even had there been, for the sake of argument, some "former connection" of Australia, later cut off by submergence, this could not have accounted for the all-round more "primitive" character of the fauna of Australia.

This applies even to the aboriginal natives of Australia, which are admitted by anthropologists to be the "most primitive" of the existing species of mankind—that is to say the *youngest* existing species of mankind. The "primitive" aborigines of Australia like its "primitive" indigenous mammalia, are of *later* origin within Australia itself. "Primitive character" of existing organisms in their zoological classes or orders denotes *later*, not earlier origin, as is pointed out further on in this chapter.

Were Australia, in fact, as ancient as either Europe, Asia, or Africa its marsupials should by this time have become as completely extinct as have the marsupials of all these more ancient lands.

Had Australia ever been connected with either Asia

or Africa, the Australian fauna should certainly consist of Asiatic or African genera and vice versa.

Nay, more, even if as ancient as either, Australia should have possessed equally advanced mammalian types. That this is not the case conclusively proves two things, namely : (1) that Australia is of more recent elevation than either Asia or Africa ; (2) that there has never been any connection with either Asia or Africa.

“ Primitive ” character of the organism in its class denotes not *older* but *later* origin. This refers only to existing organisms in their classes. The reverse holds good in the case of fossilized remains. The older the rock in which fossils are found, the more primitive will be the type, and therefore the older the organism.

The “ Primitive ” Flora of Australia

In Australia are flourishing plant forms that in the older continents are only found as fossils ! The scenery and animals of Australia resemble, to a remarkable extent, those of the Jurassic period. In the moist tropical forests of Australia there are found huge tree-ferns and giant tulips and lilies, all of which, no doubt, originated in Australia. There are twenty-three distinct species of palms found in Australia only.

Palms and ferns are peculiar to warm climates, and were among the predominant types of taller growing plants when the earth was young and more warmed by internal heat. Australia and New Zealand being the youngest parts of the earth's surface to-day, we may expect to find there still a resemblance to the earlier conditions of climate, flora, and fauna of the older lands.

A striking feature about the flora of New Zealand,

too (which, we shall see, lies within the Australian region), is the prevalence of younger types—a cryptogamic character generally. Ferns and other “primitive” types of flowerless plants are in great variety—features pointing to a flora of comparatively later origin.

Australia possesses some 10,000 species of plants, most of which are found nowhere else, and have no doubt been evolved in Australia only.

The indigenous trees of Australia could have no stronger mark of *regional origin* indelibly stamped upon them than the curious reverted position of their leaves, which hang vertically (turning their edges to the sun), entirely different from the trees of other parts of the world. This difference must be inherent in all the species, and the cause fundamental in the primordial protoplasm of the region.

The 400 species of Australian gum-trees, in addition to the above peculiarity of leaf, possess the further peculiarity of shedding their bark every year, instead of their leaves like the trees of the rest of the world, the cause of which must be the same.

The “Primitive” Avifauna of Australia

Just as there is a younger character about the flora of Australia so there is about its avifauna.

It is in Australia that we may expect to find birds which still have “primitive” reptilian habits, and we find such birds in the *Megapodes* of Australia, a strange group of birds which still adopt the habits of their reptilian ancestors by scraping a hollow in the sand in which they deposit their eggs, covering them over with sand like the lizards do to-day, and leaving the sun to do the hatching. The mallee birds of Western

Australia do this only, but the brush turkey of Eastern Australia scrapes up a mound of sand and leaves, in which it deposits its eggs, which are hatched partly by the heat of fermentation and partly by the heat of the sun.

The *Megapodes* supply as distinct evidence of the reptilian ancestry of the birds as do the *Monotremes* of the reptilian ancestry of the mammals.

All birds once did as the *Megapodes* and the lizards still do to-day.

The maleo of Celebes (in the later elevated Australian region) is the only other bird having the same habits as the *Megapodes* of Australia. As well as its reptilian habits, the maleo possesses a peculiarly reptilian expression about its head.

Perhaps nothing could more strikingly emphasize the ornithic singularity of Australia than the fact that practically the whole of its extensive order of *Incessores* or Passerine birds exhibits more or less "primitive" and abnormal Passerine characters.¹

For instance, the real position of the so-called "Finches" of Australia, as compared with the true Fringillidæ of the older continents, remains extremely doubtful. So much so that it has been suggested that the so-called "Finches" of Australia may be the primitive descendants of some ancient group from which both the true Fringillidæ and Ploceidæ of the older continents have been derived.¹

So far from being the primitive descendants of some ancient "common parent" group, the so-called "Finches" of Australia no doubt are themselves entirely distinct *younger evolutions* within Australia, evolving along parallel lines to those of the true Fringillidæ of the older continents.

¹ *Encyclopædia Britannica*, 9th edition.

Abnormal Passerine character is also seen in the Australian lyre-birds and scrub-birds, both of which are such abnormal types that they have to be classed entirely by themselves.¹

The "Primitive" Fauna of Australia

Just as there is a younger character about the flora and avifauna of Australia so there is about its fauna.

It is in Australia that we find the most *distinctly* "transitional" form between fish and amphibian (Barramunda of the *Dipnoi*).

The Australian *Ceratodus* (Barramunda) is the very *youngest* of the existing *Dipnoi* (lung-fishes), which is proved by the fact that it is the only one having a "primitive" build of the skeleton with only one air-breathing lung, as compared with the more highly developed skeletons and two lungs found in the *Lepidosiren* of South American rivers and the *Protoptera* of African rivers.

The conclusion is irresistible that the Australian *Ceratodus* is a *later* evolved lung-fish than either the South American *Lepidosiren* or the African *Protoptera*. Here again we have evidence that Australia is the most recently elevated continent on the globe.

No doubt, too, that all the existing "freshwater" lung-fishes are much later evolutions than the Devonian "freshwater" lung-fishes.

Haeckel wrongly supposed the *Ceratodus* of Australia to be the *oldest* of the existing lung-fishes, instead of the youngest as it really is.

It is against the first principle of evolution to suppose that so distinctly a "transitional form" (fish to

¹ *Encyclopædia Britannica*, 9th edition.

amphibian) as the *Ceratodus* is a "survival unchanged" from the immensely remote Devonian period.

The same applies to such distinctly "transitional forms" as the Monotremes and Marsupials of Australia, both of which cannot be, as is supposed, "survivals unchanged" from the remote *Triassic* and *Jurassic* periods.

It is in Australia, too, that we find the most distinctly "transitional" form between reptile and mammal (*Ornithorhynchus paradoxus*).

In the fauna of Australia we are able to see side by side the three definite morphogenic phases through which the Placental Mammalia of the older continents have advanced, namely: (1) Monotreme, (2) Marsupial, and (3) Placental.

These three progressive phases found in its mammalia must mean *successive evolutions* of mammalia in Australia. That the Monotremes are the latest of these three phases is shown by the fact that the brains of Monotremes are even less developed than the brains of Marsupials. The Monotremes, therefore, are *younger* mammalia than the Marsupials, just as the Marsupials are *younger* than the Placentals.

Immature Mammalia

There is a large body of evidence tending to show that the marsupial phase is an *immature* mammalian phase—a definite morphogenic phase through which the placental mammals of the older continents have advanced.

It is in the remote Triassic epoch that we find traces of the existence of mammalian forms—probably pouched.¹

¹ Clodd's *The History of Creation*.

“ The oldest fossil remains of mammals that we know were found in strata that belong to the earliest Triassic period—the upper Keuper.”¹

Probably the *Tritylodon* of the *Triassic* belonged to the *Monotremata*. Generally speaking, Monotremes belong to the *Triassic* period, Marsupials to the *Jurassic*, and Placental mammals to the *Cretaceous* period.

The Australian monotremes and marsupials, therefore, are no doubt *later* evolutions of mamalia than the monotremes and marsupials of the *Triassic* and *Jurassic* periods of the older continents and islands.

Their reptilian characters clearly show that the Australian monotremes are quite the *youngest* mammals in existence. The echidna, for instance, still lays eggs, has internal organs which in many respects resemble those of reptiles, and also has the *lowest blood temperature* of any existing mammal.

Dr. R. Broom has shown that while the Australian monotremes possess highly “specialized skulls”, their skulls less resemble those of the *Therapsida* reptiles than do the skulls of most of the higher mammals. This significant fact furnishes further evidence that the Australian monotremes have been derived from later evolved *Therapsida* reptiles quite distinct from those from which the higher mammals have been derived.

The very fact that all marsupials possess inferior (that is *undeveloped*) mammalian brains, affords the strongest possible proof that marsupials are *immature* mamalia on the way to the placental phase.

This is further proved by the fact that the young of all marsupials are born in so *immature* a state that they

¹ Haeckel in *The Evolution of Man*, vol. xi, p. 597.

have to be further developed in the pouch of the mother.

All the diversified groups of Australian marsupials, therefore, such as its pouched moles, mice, rats, cats, etc., are the *later evolved immature* equivalents of the placental moles, mice, rats, cats, etc., of the older continents in which the brains are more highly developed and the pouched structure has long since disappeared.

So that in the later evolved marsupials of Australia we have evidence of *unrelated type repetition*—of definite morphogenic phases in the evolution of species. In other words, proof that all the species of a genus are merely *unrelated repetitions of a type*.

Existing Evidences of "Transition"

As a matter of fact, several of the Australian and South American marsupials are at the present time in various stages of "transition" from the pouched to the placental phase.

In Australia, for instance, we find several species of indigenous rats and cats which have already completely lost the pouch and reached the placental phase. So has the indigenous dingo.

It is an entirely groundless conjecture that the dingo is a once domesticated dog, introduced from somewhere else into Australia, and "since gone wild". It is quite unlike any of the dogs of the rest of the world and is the *youngest* existing species of dog in the world to-day. It is even unlike the *Dhole* (the native wild dog of India), which it most nearly resembles, but, unlike the *Dhole*, the dingo has a bushy tail which the *Dhole* has not. Unlike all other dogs of the world

the dingo has a long bushy tail like that of a fox, but the tail is generally carried curled forward over its haunches.¹

The dingo, in fact, is more like a wolf than a dog about the head and, *like the wolf, hunts in packs*.

Like all *naturally* wild animals, even if tamed it is not to be trusted, for as soon as it escapes from captivity its naturally wild and bloodthirsty instincts return. This would not be the case had the dingo been once domesticated and "since gone wild".

We may safely take it that the few indigenous placentals of Australia, found nowhere else and supposed to be once domesticated animals introduced from somewhere else and "since gone wild", are in reality indigenous Australian mammals that have already lost the pouch.

There is absolutely no shred of evidence to show that any of these Australian placentals have come to Australia from anywhere else. None of these species are found anywhere else.

It is safe to conclude this from the fact that there are numerous indigenous Australian rats and cats which have *not yet lost the pouch*. Certain other species have already partially done so.

The bandicoots of Australia possess a beginning placenta which is no doubt advancing to the true placental phase. On the other hand, the echidnas are still the most *immature* pouched animals in existence, the pouch only appearing when the laying season approaches. The Ornithorhynchus apparently is still advancing *towards* the pouched phase.

In South America, too, we find the so-called opossums with pouches in all stages, "from complete

¹ Chambers's *Information for the People*, vol. 1, p. 690.

development to merely two lateral folds of the abdominal skin partially covering the teats ”¹ ; while in others all trace of the pouch has already completely disappeared. We may be quite sure that all these possessed the characteristic pouch during earlier stages of development.

The fact that there are found in the marsupials of South America more species which have already either partially or completely lost the pouch than are found in the marsupials of Australia would seem to indicate that the South American marsupials are, on the whole, of *earlier* origin than the Australian.

The Jurassic pouched mammals having everywhere become extinct goes to show that the Australian and South American marsupials are *later* evolutions of pouched mammalia than the extinct types, from which they both specifically differ.

“ Long Isolation ” Fallacy

The existence of marsupials in South America, where there is no question of “ long isolation ” of South America from some other continent, is fatal to the theory of the “ long isolation ” of Australia (from some supposed continent) as being the explanation of its marsupial fauna—an absolutely groundless fallacy.

Moreover, the *definite progressive phase*—Marsupial to Placental—takes place *regardless of mere environment*.

So that, whether or not the island of Australia had been “ long isolated ” from any other portion of the earth’s surface, it could *neither retard nor hasten* the “ transition ” of its marsupial fauna from the marsupial to the placental phase.

¹ *Encyclopædia Britannica*, 9th edition.

Why should evolution have stood still in the plants and animals of Australia only ?

Why have not the plants and animals of other isolated islands, such as Madagascar and Borneo, also remained at a " primitive " stage ?

Judged by the standard of development of their indigenous mammals, Madagascar and Borneo are far older than Australia.

It is in accord with the first principle of evolution that the more advanced the organism in its zoological class, the older it is.

To class the monotremes and marsupials of Australia as the oldest existing mammals (" living fossils ") and Australia, therefore, as some writers do, the " oldest existing continent ", is, in effect, evolution turned upside down and stood upon its head.

As regards the further fallacy sometimes heard, that the Australian marsupials have " survived unchanged " because they have escaped extinction through the absence in Australia of more advanced types. Here, again, the case of the South American marsupials, where this explanation also cannot be put forward, shows the baselessness of this supposition in the case of the Australian marsupials.

The evidence of Australia would appear to indicate that there is a connection between the presence of a marsupial fauna *to-day*, and comparatively recent elevation of the land ; thus supplying the key to the somewhat analogous case of South America.

Either a portion or the whole of South America has probably been elevated at some period earlier than that at which the elevation of Australia took place, but later than that at which the elevation of North America took place. North America, again, must have been elevated *later* than Europe, for Darwin has remarked,

“several highly-competent observers believe that the *existing* productions of the United States are more closely related to those which lived in Europe during certain later Tertiary stages than to those which now live here.” This can only mean that North America is of later elevation than Europe.

It is at least significant that the contrast generally between the faunas of North and South America—especially in their mammals—is great and striking. These features are those found in the faunas of completely isolated or separately elevated regions.

A Much Debated Question

The origin of Australia's remarkable marsupial fauna, as a matter of fact, is puzzling zoologists more and more when viewed from the Darwinian standpoint, and must continue to do so.

The extraordinary character and composition of the Australian fauna can only be explained by the clear recognition of the fact that Australia is a large *separately elevated island of later elevation than the great continents*.

If once this fact were clearly recognized there would be an end to the much debated question as to the origin of the Australian fauna and fantastic speculation as to the mode of its supposed entry into Australia from that vague “somewhere else” so useful on occasion.

But for the obscuring influence of the Darwinian theory the lesson of Australia and all that it means would long ago have been recognized.

In support of this theory and its consequence—the “long isolation” fallacy—the groundless idea has been put forward that all the diversified groups of

Australian marsupials may have "radiated" from marsupials which *may* have come from Asia somewhere about the Tertiary period, by way of some entirely hypothetical "former connection".

All this because of the persistent idea that mammals could not have been evolved on islands. The Australian mammalia, therefore, it is assumed, simply *must* have come to Australia from "somewhere else"—*anywhere* else, in fact! So that all kinds of impossible and fantastic theories are pressed into service in support of this fundamental fallacy.

Would it be likely that only the descendants of those marsupials which (for argument sake) had migrated from Asia to Australia would have continued in Australia as simple marsupials? Why have not the descendants of those marsupials which we must assume were left behind in Asia also continued *there* as "survivals unchanged"—as just simple marsupials in fact—merely because of the "long isolation" of Asia from Australia? There is not a single marsupial to-day in Asia or Europe or Africa. The marsupials of all these more ancient lands have, no doubt, long since advanced to the placental phase.

When we find a large isolated island like Australia, in which not alone the whole of its indigenous flora and avifauna exhibit more or less "primitive" characters but practically its entire indigenous mammalia as well, consists of *immature* mammalian forms, among them the most immature mammals in existence—the Monotremes—such facts as these can bear only one interpretation—*later origin*.

Judged by the standard of development of their indigenous faunas, the islands of New Guinea, Tasmania, Rottneest Island, Garden Island, and other small islands in the vicinity of Australia have most

probably been elevated at about the same period as Australia itself.

A Strange Zoo of Pouched Animals

Australia is a land of pouched creatures—big and small. With few exceptions they all have pouches in which to carry their young. Why are they there, all these strange pouched creatures? This is one of the riddles of Darwinism. The answer, however, is plainly stamped upon the fauna and flora of Australia.

There are in Australia a great many kinds of pouched animals—queer forms all of them. Perhaps the queerest of all are strange mammals that lay eggs! These are the *youngest* mammals in existence, and found in Australia—the world's wonderland of old-world flora, strange reptiles, abnormal types of birds, and pouched mammalian forms.

Australia does not occupy that place of importance in biology to which it is entitled. It is by a very long way the most interesting country in the world to-day. There is no other country in the world like it.

Apart from its scientific importance Australia should be regarded as the world's natural "zoo"—the only country whither visitors from the older parts of the world to-day may go to obtain a glimpse of Jurassic animal life.

"Animals that Seem to Belong to Another Planet"

In an interesting description of the wonders of Australian animal life Arthur Mee (in *My Magazine*, February, 1928) says: "It is when we sail South and reach the realms of 'Down Under' (Australia) that

all is change, marvel, and mystery, and we come face to face with animals that seem to belong to another planet, another order of creation, with creatures in almost unbelievable forms. . . ."

It is really that the animals of Australia resemble those of "another epoch"—the Jurassic.

Arthur Mee goes on to say: "Even we of the twentieth century, with all our learning and experience, hardly realize how astonishing is the story of Australasian animal life. . . ."

"It is an extraordinary fact," says Mr. Mee, "that, although the animals of Australia differ so profoundly from all other life on the globe, we can trace in them developments parallel to the animals of the rest of the world."

And what is this but *unrelated type repetition*—definite morphogenesis in the evolution of species—the all-important lesson of Australia.

Arthur Mee continues: "We see in Australia the marsupial equivalents of . . . New World animals which grip with the tail, of the Old World wolf, bear, cat, mole, rat, mouse, squirrel, rabbit, etc. . . ."

"The subject of Australia's animals is full of romance and mystery. All these animals insensibly copying the outlines of other animals from which they are far sundered . . . as we should think impossible were not the proofs living, multitudinous and astonishing before our very eyes."

What, then, do all these "parallel developments" and Jurassic features about the Australian animals mean? Have they no significance—no meaning? We may be sure they have a deeper meaning than is generally supposed.

What does the "Wallace zoological line" in the Australian region mean?

Bali and Lombok

The narrow strait between these two important islands marks the sharply dividing line between two geologically as well as zoologically distinct regions of the earth's surface.

For ages past the narrow strait between these two epoch-marking islands has constituted the gate between an *older* and a *younger* world of life—the boundary line which divides the animals of the world into two great categories—Australian and non-Australian types.

Bali belongs to the ancient Indian region, and would be the older, while Lombok, lying within the later elevated Australian zoological region, would be the younger. Hence the *extreme unlikeliness* of the birds and quadrupeds of these two islands. Although only separated by some 15 miles of sea, these two islands differ from each other in their birds and quadrupeds far more markedly than do England and Japan. Why?

Elevation at different geological periods is the only explanation of these otherwise inexplicable facts.

The Australian zoological region is encircled approximately by a line passing between Bali and Lombok, thence southward down the west coast of Australia as far as New Zealand, thence passing to the east of the Low Archipelago, taking in the scattered Pacific Islands known as Polynesia.

From the Low Archipelago the line passes northward to the Sandwich Islands; thence westward to the Ladrone Islands; thence southward, passing to the eastward of the Philippine Islands and between the islands of Borneo and Celebes, taking in Celebes. From Celebes southward down the Macassar Strait, and finally back between Bali and Lombok.

Because A. R. Wallace was the first naturalist to have

perceived the existence of this distinct zoological line, it has been called the "Wallace Line" in zoology. Beyond this, however, it does not appear to be of any particular interest or importance in Darwinian zoology or biology, although of far-reaching importance in both these sciences. Wallace, however, does not appear to have perceived its real significance.

Though the various islands of the Australian zoological region have probably been elevated at different geological periods *later* than the periods at which the great continents were elevated, there has apparently been a sufficient lapse of time for the general standard of development of their indigenous faunas and floras to have so far caught up to that of the faunas and floras of the great continents, that there now remain merely those perceptible regional differences and peculiarities which differentiate the animals of the world into "Australian" and "non-Australian" types.

The animals of Australia itself, however, as the most recently elevated area of the region, are admittedly "*the lowest in the world*", which can only mean that they are the *youngest evolutions* of their types and classes in the world to-day. So that the Australian region may be regarded in biology as literally the "New World".

I submit that the lesson of Australia, rightly interpreted, furnishes conclusive evidence of the polygenic origin of species.

To misinterpret the lesson of Australia is to misinterpret the lesson of evolution.

CHAPTER V

UNRELATED TYPE REPETITION

The lesson of Australia proves two things :—

(1) That continents and islands have *not all been elevated at the same time*, but even the *later* are enormously ancient.

(2) That there have been different evolutions of life at different geological periods.

Different evolutions of life at different periods imply different origins in time and space. This again implies *time-range*, which is the only explanation of the extinction of species and even whole genera in the past in every zoological class—otherwise inexplicable.

As the earth gradually cooled, life no doubt first became possible upon the land surfaces in polar regions. That period is so inconceivably remote, that it is more than probable that every vestige of that early life has long since become utterly extinct by lapse of natural time-range—the ultimate fate of all organisms.

Existing species are probably the descendants of later series of evolutions of life upon the land surfaces nearer the Equator, as these became in turn sufficiently cooled, after long ages of time, for life to begin upon them. Many of these have already become extinct by lapse of natural time-range.

When apparently the same species, or same genera, found in the Palæozoic rocks of an earlier period are met with in the rocks of a later period, it does not follow that they must be “survivals unchanged” of the same species or genera found in the earlier rocks.

Evidence exists of successive repetitions of Palæozoic forms, which must have originated in successive epochs. For example, in the Triassic epoch we find that mammals (probably pouched)¹ co-existed with the Triassic *Therapsida* (mammal-like reptiles) from which it is now generally believed that the existing mammalia have been derived.

It follows that the Palæozoic fishes (*Rhipidistia*), from which the Triassic mammalia were derived, must have been of enormously earlier origin than those from which the Triassic *Therapsida* reptiles were derived.

If, then, the existing mammalia have been derived from the Triassic *Therapsida*, it follows that the Triassic mammalia were separately evolved mammalia of enormously earlier origin than the existing mammalia. We have here evidence of entirely distinct earlier and later evolutions of mammalia, which means that there must have been, at different epochs, *successive repetitions* of Palæozoic *Rhipidistia* types of fishes.

It follows further that the existing marsupials of Australia and South America (being still immature mammalia) are the youngest of the existing mammalia—so that they must have been derived from much *later* evolutions of Palæozoic *Rhipidistia* fishes than those from which the existing placental mammalia have been derived.

Since Australia has never been connected with any other continent, it proves that the Australian and South American marsupials are unrelated repetitions of the marsupial type. So are the Triassic mammals. So are the extinct marsupials of Europe, all of which furnish evidence of *unrelated type repetition* at different epochs, and in different regions of the earth's surface.

¹ Clodd's *The History of Creation*.

Epochal Reptile Types

There is evidence, too, of successive evolutions of distinct epochal reptile types in the past, which connote successive evolutions of distinct types of Palæozoic fishes in the past.

The fact that there are no more "transitional forms" intermediate between reptile and bird (such as *Archæopteryx* and *Hesperornis*) shows that the *Ornithoscelida* reptile types from which *Archæopteryx* and the birds were derived were entirely distinct, as well as very much earlier evolutions of reptiles than the existing reptiles. The many types of birds are from as many reptile types.

There are no more such types as the lower amphibians and labyrinthodons of Carboniferous times, through which it is thought that the mammalian line has probably passed, and which were distinct from the Permian and Triassic labyrinthodons.

Nor such types as the labyrinthodons or stegocephala of Permian and Triassic times—highly developed amphibians from which it is thought the existing mammalia have *not* been derived.

Nor such types as the mammal-like reptiles, the *Therapsida* of the Permian and Trias, from which, on the other hand, it is believed that the existing mammalia have been derived.

Nor such reptile types as the *Ichthyosauria* of the Jurassic epoch.

All these extinct reptile types no doubt were derived from specific Palæozoic fishes of earlier periods than those from which the existing reptiles have been derived.

These extinct reptile types *can never recur*, since each organism is characterized by a definite form

which is determined by definite chemical substances, for, no doubt, the earliest Palæozoic fishes from which these reptile types were derived differed in their specific chemical constitutions from those of the Palæozoic fishes of a later epoch from which the existing reptiles have been derived.

The Lizard Type

Huxley supposed that the existing lizards are "survivals unchanged" from the remote Permian epoch, merely because of their structural resemblance to the *Sauria* of that remote epoch.

The existing lizards are not likely to be "survivals unchanged" from the remote Permian epoch, as supposed by Huxley. They are most probably later evolutions of the type.

Repetition of the "lizard type" is exemplified in the New Zealand *Hatteria* lizard, and shows the unsafeness of regarding the existing lizards as "survivals unchanged" from the Permian epoch.

The *Hatteria* lizard of New Zealand, while showing, by the "primitive" character of its structures, that it is quite the latest evolution of the "lizard type", yet has so closely *repeated the type* of the ancient Permian Stegocephala lizards that Haeckel supposed it to be among existing lizards, "the sole survivor" of the ancient Stegocephala lizards!

It is a mistake—not evolution in fact—to regard the most "*primitive*" form as the *oldest* existing form in its zoological class.

Since a calf is an earlier stage of a cow, it is tantamount to saying that a calf must be a "primitive" cow.

The importance of the *Hatteria* lizard is not that it is the *oldest* "survivor" of the Permian Stegocephala,

but that it is the *youngest* or *latest repetition* of the Permian Stegocephala type. New Zealand lies within the later elevated Australian region, which would account for the presence of the *Hatteria* lizard there.

The existing tortoises, turtles, serpents, and *Crocodylia*, are no doubt reptile types (entirely distinct from the *Sauria*)—types of their own beyond which they cannot advance. They may therefore be called true or permanent reptile types.

The Scorpion Type

As in the case of the existing lizards, Huxley supposed that the existing scorpion species are “survivals unchanged” from the remote Carboniferous epoch. In this connection he remarks, “No doubt since the Carboniferous epoch, conditions have always obtained, such as existed when scorpions of that period flourished.” Why for scorpions only?

Whenever “survival unchanged” over vast periods of time is assumed for any species, we may know that we are treading upon unsound ground.

Whatever else may be the reason that existing scorpion species resemble those of the extremely remote Carboniferous epoch, it cannot be “uniformity of environment”. There is no such thing over vast periods of time, as Spencer has pointed out.

The existing scorpion species greatly differ in size and character, and are found in all kinds of climates and environments all over the world. They are far more likely to be *later repetitions* of the scorpion type, than “survivals unchanged” from the enormously remote Carboniferous epoch.

That is to say that at the Carboniferous period the existing species of scorpions were in an earlier stage

of their development than were the fully-developed scorpions of the Carboniferous period.

Why Huxley did not ascribe the supposed "survival unchanged" of the existing lizards to "uniformity of environment", as he has done in the case of the existing scorpions, is not easy to understand, unless indeed the fallacy of this explanation is more obvious in the case of the lizards.

Simple Organic Types

When we meet with simple organic types, such, for instance, as the *Globigerinæ*, *Terebratula*, and *Lingula*, which appear to have remained just the same from an early geological period, seeing that "survival unchanged" over vast periods of time is against the first principle of evolution, we should rather, I think, suppose that such simple types are organisms of short time-ranges, giving place to later evolutions of similar types—instances of *repetition of the type* and not persistence of the species.

It is improbable that the existing forms of *Globigerinæ* and *Diatoms* are, as supposed, the *same species* which lived millions of years ago, and whose shells compose the chalk and limestone strata of the *Cretaceous* period.

The fossil forms of the chalk and limestone strata are found to resemble present *shoal-water* deposits more than those found to-day in the oozes of deep ocean beds, which goes to show that the chalk and limestone strata of the *Cretaceous* period were not, as formerly supposed, upraised deep ocean beds, but were deposits upon the beds of shallow seas, which may have been land-locked seas containing lime and other

minerals necessary for the shells of the ancient foraminifera.

The coin-like *Nummulites*, whose shells compose the *Eocene* limestone strata of the Tertiary period, were apparently not the *Globigerinae* whose shells chiefly composed the chalk and limestone strata of the earlier *Cretaceous* period; facts pointing to successive evolutions of simple aquatic types.

Because fossils of Algæ, Crustaceans, etc., have been found, which are estimated to be some two hundred million years old, and so closely resemble forms found to-day that systematists have no difficulty in finding the genera among existing forms into which they can be fitted, is no proof that the same, or even related genera, exist to-day. To suppose that the existing Algæ and Crustaceans which resemble those fossil forms are "survivals unchanged" for two hundred million years, is the one inadmissible explanation of the facts. Rather the existing Algæ and Crustaceans furnish evidence of *unrelated repetitions* of the fossil types. So with the existing *Beryx* type of fishes, and those found in the chalk.

Australia affords ample evidence of this in its plants and animals, which, while certainly *later*, have so closely *repeated the types* of plants and animals of the older continents, that systematists have no difficulty in finding the genera into which the Australian genera can be fitted.

Similarly the ants found in amber, and estimated to be some two million years old. Though some of these are said to resemble forms found to-day, it by no means follows that they are the identical, or even species "related" to those living to-day. Mere structural resemblance is no proof of "survival unchanged" or of "relationship".

Arthropod Type Repetition

The worm-like creature *Peripatus*, owing to the "primitive" character of its structures, is, we are told, "regarded as an animal of the very highest importance and antiquity, and is believed to be a nearly related representative of the ancestor of all air-breathing arthropoda, i.e. of all insects, spiders, scorpions, and myriopods."

As though the tremendous range of diversified forms included in the wide class of the Arthropoda have all been derived from some *one* "air-breathing ancestor"!

Instead of being evidence of its great "antiquity" the elementary character of its structures (as in the case of the Hatteria lizard) really shows that the high importance of the *Peripatus* lies, not in the fact that it is the *oldest*, but more probably the *youngest* evolution of the existing Arthropoda.

There are several distinct species of the *Peripatus* found in widely separated regions of the earth (unrelated type repetitions), but wherever they do occur, the elementary character of their structures indicates that they are a type of comparatively recent evolution, whose simple structures merely resemble those of all the "primitive" ancestors of the Arthropoda.

The Ratite Type

Perhaps the most markedly *regional repetition* of a distinct type, unparalleled in any other region of the world, or in any other class of animals, is that of the *Ratitæ*, a struthious type of flightless birds, so peculiar as to form a subclass of Aves, and practically confined to the isolated islands of the Australian region.

Being all flightless birds, and distinct species confined to each isolated island, there can be no question of "descent from a common ancestor" of the region. They are unquestionably unrelated type repetitions within the scattered islands of the Australian region.

The Kangaroo Type

Besides some dozen distinct species of typical kangaroos, there are numerous species of *kangaroo-like* wallabies of various sizes and distinct types. Some have brush-like tails, others have spurred tails, some climb trees, others live in rocks. Some are rabbit-like, others are rat-like, while they all have pouches and long hind legs, and leap like the typical kangaroos.

Rat-like wallabies are found on the mainland, while others are found on the small islands off the western and southern shores of Australia. Those species found on the mainland not alone differ from those found on the islands, but those on the islands differ from one another.

The wallabies found on Garden Island, for instance, differ altogether from those found on Rottnest Island. The first Dutch navigators who landed on Rottnest Island believed the wallabies found there to be "gigantic rats", so like rats are they. Yet they are all classed as belonging to the "Kangaroo family"!

It is a mistake to suppose, merely from their "structural affinities", that the many diversified species of kangaroo-like, rabbit-like, rat-like wallabies are all related to one another, and to the different species of *typical* kangaroos, by "descent from a common ancestor of the region", as implied by the Darwinian theory.

Not only are all these "Kangaroo-like" types too

diversified, but they possess " composite " characters, which prove *disconnection*, rather than " connection " with the types they resemble.

Since each organism is characterized by a definite form which is determined by definite chemical substances, they can only be explained as *unrelated type repetitions*, fundamentally due to " chemical affinities " in the protoplasms of the region.

The Horse Type

The complete extinction of the horse kind in the New World at a comparatively recent period, when all the New World conditions were just as favourable to them as they are to the horse kind of the Old World introduced there to-day, can only be explained by lapse of natural time-range. Evidence of different origins, and of *unrelated repetitions*, of the horse type in the New and Old Worlds.

The Ape Type

The broadest and most distinct evidence of *unrelated type repetition* is seen in the *distinct groups* of Platyrrhine monkeys of the New World, and Catarrhine monkeys and apes of the Old (strictly regional distribution of specific types) the cause of which must be *fundamental* and cannot be ascribed to " descent from a common ancestor of the region ".

Type Repetition Pure and Simple

In the Galapagos Islands there exists a remarkable hawk of *composite* type described by Darwin as " curiously intermediate between a buzzard and the

American group of carrion-feeding Polybori, and with these latter birds it agrees most closely in every habit, and even tone of voice ”.

We have here an interesting and instructive example of the repetition of two entirely distinct types in a single species evolved in an island where neither of the two distinct types (buzzard or Polybori) exists—a clear case of type repetition without ancestry of either of the two pure types—showing the extraordinary definiteness of *type* inherent in protoplasm.

We need, therefore, feel no surprise that the fauna of Australia (without relationship) have followed, with marvellous fidelity in the species and genera of every zoological class, the same *definite evolutions of type* as have the earlier evolved fauna of the older continents.

The Galapagos hawk goes to show, too, how little reliance can be placed in mere “structural resemblance” as evidence of “common parentage”—the outstanding lesson of Australia.

It is plain that the Galapagos hawk could not have inherited its composite type from two distinct ancestors—pure buzzard and pure Polybori—even had these pure types existed in the Galapagos Archipelago.

Like the palæotherium, it could only have done so from an ancestor of composite type. Since there is no such composite type existing anywhere outside the islands, its composite ancestor could only have been evolved within the Galapagos Archipelago, from protoplasm of a composite chemical character.

An analogous case of an island composite type at one time existed in the island of Tasmania. An almost complete skeleton of an extinct giant wombat is said to have been discovered in Tasmania in 1920, closely resembling a rhinoceros in structure, with horn and armour complete.

Now, as in the case of the Galapagos hawk, the important feature in this case is that Tasmania is an isolated island upon which no pure rhinoceros type has ever existed.

Even, however, had a pure rhinoceros existed in the island, this wombat-rhinoceros could not have inherited its composite type from both a pure wombat and pure rhinoceros ancestor. It could only have done so from a composite ancestor like itself, which having existed nowhere outside Tasmania, could only have originated in the island of Tasmania from a Palæozoic *Rhipidistia* ancestor of composite character, and this from protoplasm of a composite chemical character, since each organism is characterized by a definite form which is determined by definite chemical substances.

The biological significance attaching to these island "composites" (especially the Galapagos hawk) is that they are repeating in a single island species the types of *two* entirely distinct species, from the ancestors of neither of which can it have descended, showing that all the species of a genus are merely *unrelated repetitions of a type*—conclusively proved by the animals of Australia.

The great lesson of Australia is that of *unrelated type repetition* in every zoological class.

Its indigenous fauna are independent "*parallel developments*", which, though of entirely separate and later origin, have advanced along the same definite morphogenic phases as have those of the older continents (fish, amphibian, reptile, bird, and mammal), as seen in its pouched moles, mice, rats, cats, rabbit, squirrel, bear, etc.

CHAPTER VI

ISLAND EVIDENCES

The indigenous fauna and flora of the various isolated islands of the world constitute valuable sources of evidence bearing upon the important question of the origin of species.

When finding difficulty in accounting for the presence of certain kinds of animals upon isolated islands, Darwin invariably dismissed these admittedly "serious difficulties" of his theory with the vaguest speculation as to how distant and isolated islands *might* have been stocked from some hypothetical mainland.

In the interests of the truth in the matter, this is to be regretted, for it is not too much to say that the evidence afforded by the fauna and flora of the various isolated islands constitutes the chief, if not the only available means for testing the validity of the Darwinian theory of the common origin of all life.

It is a great pity, therefore, that the most crucial evidence upon which the validity of this theory turns, namely, that furnished by the isolated islands of the world, has not been more critically and seriously taken into account.

We find several species of the same genus side by side in the circumscribed area of an island (take the lemurs of Madagascar), yet differing more from one another than species of the same genus found on two widely separated continents.

In the case of those differing species found on widely separated continents, the differences between the

species, in order to meet the requirements of the Darwinian theory, are ascribed to "modification" by the "physical conditions of a country".

To what, then, can be ascribed the differences between the species on the same island, where the "physical conditions" do not differ? Here can be seen the fallacy of the "modification" by the "physical conditions" idea, to account for the differences between species of the same genus.

The fact is that in whatever part of the globe animals are found possessing "structural affinities" they are grouped together as "species of the same genus". Though this is merely an arbitrary grouping of "structural affinities", it is assumed under the Darwinian theory to imply "common parentage".

So that, owing to mere "structural affinities" in the animals found there, no matter how unlikely or impossible it may be, the most widely separated regions, it is assumed, simply *must*, at some time or other, have been connected!

Thus arises an unsound geology, as well as an unsound biology—as indeed we see in the case of Australia.

On the one hand, under the Darwinian theory, "long isolation" is supposed to have *produced* "modification" in the fauna and flora of isolated islands, and on the other hand, it is supposed to have *prevented* "modification" in the marsupial fauna of Australia!

"Long isolation" thus is supposed to act in two diametrically opposite directions. These two mutually contradicting theories cannot both be right, and I believe that both are wrong.

The terms "indigenous" and "endemic" as used in the Darwinian sense can have no meaning, for

species which are supposed to have come from " somewhere else " to an island can hardly be said to be " indigenous " or " endemic " in the strict sense of the words. Under the theory, however, of the *island origin* of the species, these terms would be used in their true sense.

Each isolated island is, as it were, a separate and independent witness—each a separate little continent with its own story of the life forms found indigenous and peculiar to it only.

Invariably both the fauna and the flora of remotely isolated islands tell the same story. We do not find the fauna only, or the flora only, possessing marked local individuality.

There exists absolutely no reason why life could not have originated upon islands as well as continents.

Not only is there no reason why it could not have done so, *but every reason why it should have*. The really surprising thing would be if it had not done so.

The Galapagos Islands

In the diary of his visit to the Galapagos Islands in the *Beagle*, Darwin remarks, " The natural history of these islands is eminently curious, and well deserves attention.

" Most of the organic productions are aboriginal creations, found nowhere else ; there is even a difference between the inhabitants of the different islands. . . . Considering the small size of these islands we feel the more astonished at the number of their aboriginal beings, and at their confined range. Seeing every height crowned with its crater [there are more than 2,000 craters in these islands] and the boundaries

of most of the lava streams still distinct, we are led to believe that within a period geologically recent, the unbroken ocean was here spread out. Hence both in space and time, we seem to be brought somewhat near to that great fact—that mystery of mysteries—the first appearance of new beings on this earth.”

These words imply an instinctive feeling that he stood in the presence of life of *comparatively recent* and *local* origin.

The fauna and flora of the Galapagos Islands, which lie some 600 miles to the westward of the South American coast, are peculiar to a degree entitling the ranking of them as a distinct zoological region !

Practically all the land birds are peculiar to these islands only, and more than half of them consist of *altogether peculiar genera* !

I quote again from Darwin's *Beagle* diary as follows : “ I have not as yet noticed by far the most remarkable feature in the natural history of this Archipelago ; it is that the different islands, to a considerable extent, are inhabited by a different set of beings. . . . If we now turn to the flora, we shall find that the aboriginal plants of the different islands are wonderfully different. . . . Hence we have the truly wonderful fact that in James Island, of the thirty-eight Galapageian plants, or those found in no other part of the world, thirty are exclusively confined to this one island ; and in Albemarle Island, of the twenty-six aboriginal Galapageian plants, twenty-two are confined to this one island. . . . This fact will perhaps be rendered even more striking by giving a few illustrations : thus *Scalesia*, a remarkable arborescent genus of the *Compositæ* is confined to the Archipelago ; one from Chatham, one from Albemarle, one from Charles Island, two from James Island, and the sixth from one of the three latter islands, but it is

not known from which. Not one of these six species grows on any two islands."

"Again, *Euphorbia* . . . has here eight species of which seven are confined to the Archipelago, and not one found on any two islands. . . . The species of the *Compositæ* are particularly local, and Dr. Hooker has furnished me with several other most striking illustrations of the differences of species on the different islands."

Such facts as these indicate the *separate origins* of the species upon the different islands to which they are exclusively confined.

Not only the flora, but nearly all the land birds, the five species of giant tortoises, and the indigenous reptiles, tell the same story—distinct species peculiar to different islands, and found nowhere else in the world.

Though later investigations appear to have shown that the species are not perhaps quite as exclusively confined to certain islands as was supposed by Darwin, yet they are on the whole different species confined to certain islands only, and what is of more significance, nothing like them found anywhere else in the world.

Everything, in fact, points to the separate volcanic origins of each of the islands, and to the separate origins of the various species confined to each.

So strongly, indeed, did the consensus of evidence point in this direction that, while under its spell, it drew from Darwin the words quoted from his diary written when visiting the islands.

However, when afterwards in his *Origin of Species* he referred to the Galapagos Islands, he appears to have interpreted the evidence afforded by these islands in accordance with his later advanced theory of the common origin of all life, which would require that

these islands must have been stocked from " somewhere else ". He, therefore, *supposed* this to have taken place from the South American coast.

Perceiving the weight of evidence against this theory, he says in his later written *Origin of Species* : " But this dissimilarity between the endemic inhabitants of the islands may be used as an argument against my views, for it may be asked, how has it happened in the several islands situated within sight of each other, having the same geological nature, the same height, climate, etc., that many of the immigrants¹ should have been differently modified, though only in a small degree ? This long appeared to me a great difficulty, but it arises in chief part from the deeply-seated error of considering the physical conditions of a country as the most important for the inhabitants ; whereas it cannot, I think, be disputed that the nature of the other inhabitants with which each has to compete is at least as important."

It is a " deeply-seated error " to suppose that the " physical conditions of a country " are the most important for the inhabitants, yet, according to Darwin, they are " at least as important " as something else that is another " deeply-seated error ", for it is another " deeply-seated error " to suppose that species are " modified " as the result of " the nature of the other inhabitants " of the region.

Since the " physical conditions of a country "—the stock Darwinian explanation of " modification "—admittedly could not be put forward as an explanation of the differences between the species of the Galapagos

¹ It should here be noted that in his *Beagle* diary Darwin considered that the Galapagos productions were " aboriginal creations found nowhere else ", but in his later written *Origin of Species* they have become " immigrants " from somewhere else !—(Author.)

Islands, resort is had to the nebulous explanation—"the nature of the other inhabitants with which each has to compete"!

The whole Darwinian idea of ceaseless warfare everywhere, of fierce "competition" and wholesale "extermination" of one species by another throughout nature (even "parent species" by their own children) is mere imagination.

Let us look round for a moment and see the thousands of species of carnivorous animals all over the world, which for ages past have literally lived upon other species that yet are never exterminated by them. In fact, if carnivorous species were able to exterminate the species upon which they live, they would be exterminating themselves for want of food. Nevertheless, this idea still continues to be one of the main pillars of the "competition" and "natural selection" theories.

On Darwin's own showing, the vague theory of "modification" as the result of "competition with other inhabitants" of the region, is nowhere of less force than between the peaceful inhabitants of the Galapagos Islands. There is not a single "other inhabitant" in any of the islands which is, in any sense, predaceous or competitive.

Nothing can more plainly show the undisturbed and uncompetitive life led by the inhabitants of these islands, than the fact that on one occasion Darwin saw a full-grown reptile and a bird peacefully and quietly eating at the opposite end of a piece of cactus—a friendly spirit of "live and let live" seldom found among the "lords of creation".

The peace which reigned upon those islands is further seen by the utter fearlessness of man shown by the birds on all the islands.

The following is a further example of loose reasoning in the matter of the origin of the species of the Galapagos Islands.

Referring in his *Beagle* diary to an indigenous rat found only on James Island (and undoubtedly of purely Galapageian origin) Darwin remarks: "As this island has been frequented by ships for the last hundred and fifty years, I can hardly doubt that this rat is merely a variety produced by the new and peculiar climate, food, and soil, to which it has been subjected."

It will be observed that Darwin is here putting forward the "physical conditions of a country" as an explanation of the supposed "modification" of this Galapagos rat—the very explanation of "modification" which later in his *Origin of Species* he dismisses as a "deeply-seated error".

It is to be regretted that a crucial point of evidence such as this, affecting the validity of the Darwinian theory itself, has been thus loosely handled.

It is demonstrably impossible for this Galapagos rat, or indeed any other animal species under natural conditions, to have become "modified" at all by mere "environment", still less in only one hundred and fifty years.

Cuvier found that the mummified remains of certain Egyptian species of animals of 3,000 to 4,000 years ago showed absolutely no modification as compared with the existing species of Europe. This is what should have been expected, though apparently it surprised Cuvier.

Darwin appears to have been impressed by certain faint resemblances between some Galapagos birds and some South American species. Such resemblance, however, is no more indication of "common parentage" than is the general resemblance between the various

species of *Ratitæ* found indigenous upon the widely scattered islands of the Australian region. The resemblances between them cannot be due to common parentage for they are all flightless birds, and distinct species strictly confined to each island.

Why stress only the slight resemblance between one or two Galapagos and South America species, while quite overlooking the much more significant fact that the great majority of Galapagos species are not alone unlike any species in South America, but *unlike* any species found anywhere else in the world?

Other evidence at variance with the theory of the South American origin of the Galapagos species is that, while humming-birds are found in their greatest abundance in the regions of South America opposite the Galapagos Islands, there is not a single humming-bird in these islands. Similarly, absent from the Galapagos Islands are the *Tanagridæ* and other types abounding in South America.

Even supposing, for the sake of argument, that all the different species of birds, tortoises, reptiles, and flora, indigenous to certain of the islands, had radiated from some one island of the group, why should they all originally have come from "somewhere else" to only one island in the group? If, on the other hand, they had come as stragglers from the South American coast to the various islands, in either case there should certainly be found a mixture of all the species on all the islands, and not the exclusive distribution actually existing.

Since several of the Galapagos Islands are in sight of each other, and the great majority of the land birds have never crossed from island to island (nor have the tortoises and reptiles) we may be quite sure—reading the past by the present—that none of these species

could ever have crossed the 600 miles of ocean lying between these islands and the South American coast.

However, no one could more effectually expose the groundlessness of Darwin's explanation of the differences between the inhabitants of the Galapagos Islands (as set forth in his *Origin of Species*) than he himself has done in his previously written *Beagle* diary, in the following words: "I must repeat that neither the nature of the soil, nor height of land, nor the climate, nor the general character of the associated beings, and therefore their action one on another, can differ much in the different islands."

That is to say that neither the "physical conditions", nor the "general character of the associated beings" ("other inhabitants!") would be sufficient to account for the peculiarities and differences between the species of the different islands.

What ground then is left for his theory that the indigenous species of the Galapagos Islands are "*locally* modified" species from South America?

Seychelles Islands

Separate elevation of the islands, and the *island origin* of their indigenous flora and fauna, is the only explanation of the following remarkable facts.

"North of Madagascar are the Aldabra Isles and the Seychelles. . . . Praslin, another island of the Seychelles group, has a true atmosphere of mystery. On this small island, and nowhere else in the world, grows the famous coco-de-mer—the heavy double fruit with two nuts in one shell. The first of these nuts ever brought to Europe was found floating in the sea. For two hundred years after that the home of the coco-de-mer—which is shaped like the lower part of a human

body—could not be found. Scientists proclaimed it the fruit of a tree growing on the bed of the ocean. The discovery of Praslin Island settled the matter.

“Many Indian Ocean islands have characters of their own; they are so different from sister isles close by, that they might be on the other side of the world.

“Round Island, 25 miles from Mauritius, is an example. There are no snakes on Mauritius; but the poisonous Colubra snake, coloured red, white, and black, thrives on Round Island. It does not retreat from the human invader, but rears its head and prepares to fight.

“The plants and flowers of Round Island are utterly different from those of Mauritius. There is a small palm tree which—like the coco-de-mer—is found nowhere else.”¹

Island Mammals

In conformity with the Darwinian idea that mammals have not been evolved on islands, whenever any isolated island is found to contain indigenous mammals, it is forthwith classed as a “continental island”, which simply *must*, at some time or other, have been connected with some supposed continent! No wonder that while this theory lasts, no mammals of *island origin* have ever been found!

Islands have thus been classed as “continental” or “oceanic” merely upon the basis of whether they contain indigenous mammals or not.

On this arbitrary basis, then, such indigenous mammal-bearing islands as Timor, Baru, Ceram, Gilolo, Celebes, and possibly Timor Laut, would be classed as “continental islands”, whereas the great

¹ Lawrence Green in *The Outspan* (South Africa), 4th December, 1931.

depth of the Arafura Sea, lying between these islands and Australia, proves their separate upheaval, and that they have never, at any time, been connected with one another, or with Australia, or Asia, or any other hypothetical continent.

These isolated islands all contain indigenous mammals and they are of more advanced types than those of Australia, which fact goes to show that although these islands lie within the Australian zoological region, they must have been of earlier elevation than Australia itself, but probably later on the whole than that of the great continents of the world.

The islands of Australia, New Guinea, and Tasmania, containing as they do mammals of more simple (that is *younger*) types than the islands named, are probably the most recently elevated islands within the Australian zoological region, including New Zealand.

On the other hand, lying outside the Australian region are the indigenous mammal-bearing islands of Madagascar, Borneo, Sumatra, Java, Philippines, Moluccas, and Ceylon, which contain, among other advanced types of Mammalia, various forms of indigenous Primates—a fact going to show that these islands are of ancient origin, and further, that mammals of the highest types have been evolved upon ancient islands, as well as upon ancient continents.

Except for the requirements of the Darwinian theory, there exists no reason for classing any of the above islands as “continental islands”.

*Madagascar and its Mammals*¹

Suppose then, that we take Madagascar as being, from its size and geographical position with regard to

¹ The numbers and kinds of indigenous species of some of the islands referred to in this chapter are found in the *Encyclopædia Britannica*, 9th edition.

Africa, one of the most plausibly "continental" islands.

What do we find? We find that there does not exist a single indigenous Madagascar mammal on the continent of Africa, nor a single species of indigenous African mammal upon the island of Madagascar.

These facts in themselves are fatal to any theory of "former connection" between Africa and Madagascar.

The island of Madagascar is, I believe, of entirely separate upheaval, and has never been connected with Africa, but it may be nearly, or quite as old.

When we find Bali and Lombok, which are only 15 miles apart, yet show every evidence of being entirely separate upheavals at different geological periods, Africa and Madagascar lying fully 240 miles apart need not, on the score of "proximity", be supposed to have had "former connection".

Much significance has been attached to certain so-called "Asiatic affinities" between some animals of Madagascar and Asia—thousands of miles apart—while the *entire absence* of African species on Madagascar—only 240 miles apart—seems to be of no significance at all!

Because of these mere "Asiatic affinities", the highly improbable theory has been put forward that Madagascar may be the largest island left of a "considerable archipelago" (very considerable!) once existing in the Indian Ocean between Madagascar and Asia.

This strained archipelago theory is typical of the persistence of the "former connection" idea—however improbable—wherever "affinity" exists.

The length to which the idea of "former connection"—based upon mere "affinity"—is carried, can be seen in the following instance.

Because one or two species in the remotely distant

island of Celebes possess certain "affinities" with species in distant Africa, a writer remarks upon these "affinities" as being "highly significant"—of former connection between Celebes and Africa!

Whereas the really much more "highly significant" evidence (showing no "former connection"), namely, the fact that, with few exceptions, all the indigenous species of Celebes are *peculiar to that island only*, is not considered of any significance at all!

The strong individuality shown by both the indigenous fauna and flora of Madagascar goes to show that it has never been connected with Africa or Asia.

There are more than thirty-five distinct species of lemurs in Madagascar (besides extinct species), *not one of which is found in Africa*, or anywhere else in the world!

There is also a remarkable animal (*Cryptoprocta ferox*) not found in Africa or anywhere else. So different is it to anything found anywhere else, that it forms a genus and family by itself!

There are also three genera of very extraordinary rats and mice, the like of which have never been seen anywhere else; as well as many other *peculiar* mammals found only in Madagascar and not in Africa or anywhere else.

Africa, on the other hand, possesses many venomous snakes while Madagascar has none!

All the foregoing facts constitute very strong evidence against any theory of "former connection" between Madagascar and Africa.

More Island Mammals

The now rare and interesting tapir species, found indigenous to the isolated island of Sumatra and the

adjacent Malay Peninsula, have been until recently thought to belong to the same genus, but so entirely distinct are they, that they are now considered to belong to entirely distinct genera !

There can be no "common parentage" between these tapir species for the following reasons : (1) The isolation of the two regions, (2) the entirely distinct genera of each region.

It is a significant fact that the existing tapirs exhibit a close structural resemblance to the extinct tapirs of the Upper Miocene of Europe. For which reason they are regarded under the prevailing idea, as "probably the oldest existing genus of mammals !"

Why should the existing tapirs be the *only* genus of mammals to have "survived unchanged" from the Upper Miocene age !

Since "structural resemblance" is no proof of "survival unchanged" over vast periods of time, it is far more likely that the close structural resemblance of the existing tapirs to that of the extinct Upper Miocene tapirs of Europe is due to their *later origin*, and not to "survival unchanged" of Upper Miocene species.

Especially so since tapirs no longer exist in such ancient lands as Europe, Asia, or Africa, and are now only found in regions that may be for many reasons suspected of *later elevation*, such as the islands of the Oriental region, and portions of South America.

Still More Island Mammals

On the Falkland Islands there is an indigenous "wolf-like" fox—*unlike any other fox in the world*—and which Darwin was assured by the natives did not

exist on the South American coast, or upon any other island in those regions.

The only suggestion which Darwin could make to account for the presence of this fox in the Falkland Islands was that it *may* have been transported thither upon an iceberg from polar regions !

There is no other branch of natural science in which highly speculative and improbable suggestions of this kind would pass as sufficiently conclusive upon evidential points of the greatest importance. Yet this is the kind of " foundation " upon which, to a great extent, the Darwinian theory of the origin of species rests.

To begin with, even if foxes of that peculiar type had existed in South Polar regions, of which there is no evidence, it is most improbable that any polar fox (and it would have had to be more than one fox) would have happened to get on to a floating iceberg which would just have happened to strike one of the Falkland Islands at a suitable spot (and in favourable weather) for safely landing that fox on the island. And how about food for a fox floating about on an iceberg probably for several months ?

It is somewhat strange that Darwin did not attempt to account for the presence of other *very peculiar* foxes found *only* upon other islands in the South American region, unless, indeed, the iceberg theory was limited to the Falkland Island fox.

In the island of Tierra del Fuego there are found two quite peculiar species of indigenous foxes. There should not be found two distinct species of fox within the limited area of any island if they were of common parentage. This points to their being species of *separate origin* within the island, which is confirmed by their being found nowhere else in the world.

Again, in the isolated island of San Pedro, off the coast of Chile, there is another quite peculiar species of indigenous fox, not found on the South American coast or anywhere else in the world.

The indigenous *Canidæ* of the South American region—like the Platyrrhine monkeys of that region—are no doubt distinct evolutions of the region, as is seen in the fact that the indigenous dogs and foxes of the New and Old Worlds are quite distinct.

Certain indigenous South American dogs, for instance, are difficult to cross with European dogs—evidence of unrelated type repetition in the New and Old Worlds.

Yet More Island Mammals

In the isolated Philippine Islands are found many indigenous mammals found nowhere else. To mention only a few of which, there is the *Tarsius spectrum*, a very peculiar Lemuroid, found nowhere else, and also a distinct species of Galeopitheci found nowhere else.

Also peculiar species of Murines (*Batomys*) which are only found in the mountains of Luzon. Then there is also the genus *Hydromys* (*Muridæ*), which is restricted to the Philippines and Australia. There can be no common parentage between the Australian and Philippine genera of *Hydromys*.

In the islands of Borneo and Sumatra there are found indigenous species of Orangs and Galeopitheci, which latter are quite distinct from the species of the Philippine Islands—evidence of their separate origin in each of the islands named.

The Galeopitheci are considered to be strong "connecting links" between the bats and lemurs, but they are merely "composite types"—*two types in one*

—without relationship to either type (bats or lemurs).

So strange are they that they have had to be classed by themselves—where they undoubtedly belong as *distinct* “composite types”. How can they be explained by the theory of “connecting links” having “common parentage” with both bats and lemurs?

Finally, it may be stated as generally true that, from Australia onwards, all species of mammals found indigenous on islands are distinct from those of the same genera found on continents. In very many cases the island genera are altogether *peculiar* and distinct genera. Take the land birds of the Galapagos Islands, and the honeysuckers of the Sandwich Islands.

Island Reptiles

It should be borne in mind that the many indigenous reptiles found on isolated islands all over the world, so far as their bearing upon the Darwinian theory goes, are just as fatal to that theory as if they were mammals, for reptiles are no more capable of crossing seas and oceans than are terrestrial mammals.

While strangely overlooking the more serious difficulty to his theory of the numerous reptiles found indigenous upon isolated islands, Darwin was more concerned about laying stress upon the supposed absence of frogs on isolated islands, which he believed was confirmation of his theory.

As a matter of fact, however, frogs are found indigenous upon several isolated islands, and the fact that frog spawn is killed by sea water, which in Darwin's opinion went to confirm his theory, on the contrary goes to make its refutation all the more complete, for it makes it all the more difficult to account for the presence of frogs on isolated islands, while

strengthening the evidence that they have been evolved upon the islands on which they are found indigenous.

To begin with, both Australia and the neighbouring island of New Guinea are isolated islands which have hundreds of species of indigenous frogs peculiar to them only.

In New Zealand, too, there exists a rare and peculiar species of endemic frog found nowhere else.

Referring to instances of frogs found upon isolated islands, Haeckel (*Evolution of Man*) says: "We find the other extreme in certain frogs that have been discovered lately which have lost their whole historical metamorphosis and in which we get from the egg, not the tailed, gill-bearing larvæ, but the developed tail-less and gill-less frog. These frogs live in isolated islands with a dry climate, and are often without water for a long time. As fresh water is indispensable for the gill-bearing tadpoles, the frogs have adapted themselves to the local defects."

Thus we see that Darwin was mistaken in supposing that frogs are not found indigenous upon isolated islands. This by his own implication means that his theory is thereby the reverse of confirmed. Frogs, however, belong to the Amphibia.

We now come to the *Reptiles proper* found on isolated islands, of which perhaps first in importance and significance is the famous Hatteria lizard of New Zealand, which Haeckel regarded as "the phylogenetically oldest of all existing reptiles, an isolated survivor from the Permian period, closely resembling the common ancestor of the amniotes"—as though all existing reptiles, birds, and mammals have been derived from some *one* "amniote ancestor"!

As has been elsewhere pointed out, the "primitive" character of its structures shows that the Hatteria

lizard is probably the *youngest* member of the existing reptiles—not the *oldest* as supposed by Haeckel.

The generally primitive character of the flora and fauna of New Zealand indicates comparatively recent elevation of the land and, as elsewhere remarked, would account for the presence of the Hatteria lizard there. New Zealand belongs to the Australian region.

Then there are the reptiles of the Galapagos Islands, which consist of several species of remarkable lizards and five species of giant tortoises found nowhere else. It is impossible for these land reptiles to have got to those isolated islands 600 miles from the nearest mainland. Nor do any of these lizards or tortoises exist on any mainland whatever.

Still other "Island Reptiles" are the giant "dragon lizards" of Komodo, a small island lying to the eastward of Java, which have only recently become known and are said to be black in colour and 9 feet in length. They are carnivorous, and appear to live in mountain crags.

Why are these huge lizards found only upon the isolated island of Komodo and nowhere else in the world? The evidence speaks for itself. We may be sure that they have evolved from freshwater amphibia, and these from freshwater Palæozoic fishes within the island of Komodo and nowhere else.

In the isolated island of Celebes there are also indigenous lizards known as "sail-fin lizards". The males have very high crests on their heads, backs, and tails. The dorsal and caudal crests are supported by spines. These lizards are expert swimmers, and thus exhibit their freshwater amphibian origin.

In the isolated island of Mauritius there are several species of reptiles, besides several species of now extinct tortoises, all found nowhere else.

In the isolated Comoro and Aldebra Islands there are several species of tortoises peculiar to each of these islands and found nowhere else.

Most significant of all, there are the 200 species of Gecko lizards, found indigenous upon *practically all the isolated islands of the world—even to the most remote!*

A. R. Wallace, commenting upon this most important fact, could only suppose that these lizards "must have possessed some exceptional means of distribution"—which, of course, they do not.

Here, again, under the obscuring influence of the Darwinian theory, the stronger the evidence pointing to the island origin of reptiles and mammals, the more baseless are the suppositions put forward to meet it. The same thing is seen in the numerous fantastic theories put forward with regard to the origin of the Australian fauna.

As a matter of fact, the Gecko lizards are particularly *local* in their movements and habits of life, and are among the very last creatures likely to spread themselves over practically all the isolated islands of the world—even to the most remote.

Incidentally, they constitute abundant evidence of *unrelated type repetition* at many distant and isolated points.

Thus we see that, taking into account the numerous islands containing indigenous Gecko lizards, as well as numerous other reptiles, there are very few isolated islands which do not contain indigenous reptiles of some kind.

Since reptiles are on a par with mammals as regards inability to cross seas and oceans, there is just as much reason to class all islands containing indigenous reptiles as "continental islands", as there is for so classing all islands containing indigenous mammals.

This, of course, would mean that practically every island on the face of the globe would have to be considered a "fragment" of a globe embracing continent, and reveals the fallacy underlying the "continental island" theory, based merely upon the presence of indigenous mammals on islands.

Island Bats

The numerous species of very peculiar island bats, strictly confined to certain isolated islands, were supposed by Darwin to be "modified descendants" of ancestors which have flown to the islands from "somewhere else".

Darwin himself, as we have seen, has stated that it is a "deeply-seated error" to suppose that the "physical conditions of a country are the most important for its inhabitants", which automatically disposes of his theory that the peculiar island bats are the "*locally* modified" descendants of ancestors which have flown to the islands from "somewhere else".

Bats, of all animals, sleeping as they do in secluded retreats during the day wherever they are, and merely flying out at night to catch insects, are not at all likely to become modified by the "physical conditions of a country", even if such a thing were possible.

The great number of evolutions of the bat kind all over the world, including many isolated islands, has given rise to the belief that bats are, by migration, the most cosmopolitan of the mammalia.

There are some 400 distinct species of the bat kind, of which nearly half consist of the widespread, small, purely insectivorous *Vespertilio* and *Vesperugo* types.

These include the common simple-faced bats of all countries.¹

The widespread prevalence of these two small types shows that in bat types they are—like the small Gecko lizards in lizard types—the types which have been most commonly evolved at many different points of the world, including many of the most remote islands.

The bats of isolated islands, it will be noted, are only supposed to have flown from continents to islands—never from islands to continents—an “only one way” theory.

There is not a single species of peculiar island bat which is found on any other island or continent. There is thus a complete lack of corroborative evidence that bats fly from continents to islands or even from island to island.

This fact alone furnishes conclusive evidence that all *peculiar* island bats, *found nowhere else*, have been evolved upon the islands to which they are peculiar.

As a matter of fact, so far from being the roaming creatures supposed by Darwin, there is no flying creature so strictly local in its mode of life as the bat. Far more so than many creatures which cannot fly. Bats may be seen at twilight leaving their sleeping places for a short while and returning at short intervals. They seldom fly far, or for long, away from their sleeping places.

Since bats are known to hibernate in temperate regions during the winter, they are not creatures that would ever migrate voluntarily across seas or oceans. Those one or two instances of bats having been seen some distance over the waters of the Atlantic, referred to by Darwin, were most probably rare instances of

¹ *Encyclopædia Britannica*, 9th edition.

bats blown out to sea by sudden squalls of wind and finally drowned by dropping into the sea when exhausted on the wing. They would also become dazzled by the light of day and drop into the sea before they could go very far.

Instances of bats seen over the sea afford no kind of proof that a single bat driven out to sea by wind has ever reached the shores of any distant island. Indeed, the chances of this happening are so infinitesimal that we may safely dismiss this as an explanation of the fact that *practically all isolated islands have their own peculiar bats.*

If bats were the roaming creatures Darwin supposed them to be there would not be only one solitary species of (supposed to be) Old World bat found in the New World—and even that one species is far more probably merely a similar, but separate, species, evolved along similar lines in the New World, and not an Old World species at all.

The bats of the New World, with very few exceptions, all markedly differ from those of the Old, indicating separate origins; which is strongly confirmed by the fact that the whole genus *Pteropus* (flying fox type) is entirely absent in the New World.

The idea conveyed to the popular mind by the Darwinian theory is that, because bats can fly, *all kinds of bats are found everywhere!*—and they are all “modified descendants” of some ancestral bat hailing from somewhere or other.

As further evidence that bats, although able to fly, are not creatures of a roaming nature there are two species of the genus *Pteropus* indigenous to the Comoro Islands which have existed on those islands probably for millions of years, yet have never crossed the 200 miles of sea between those islands and the

African coast. Nor have any of the Madagascar species of this genus ever crossed the 240 miles of sea between that island and the African coast. Nor has any species of African bat ever crossed the sea either to the Comoro Islands or Madagascar. Nor has the giant *Pteropus* bat of Java ever crossed the sea to any of the adjacent islands.

Is it likely, then, that the *Pteropus* bats peculiar, for instance, to the distant Savage Island (South Pacific), Rodriguez Island (Indian Ocean), and those of far away New Zealand will ever have crossed the wide expanse of ocean to go to these distant islands from "somewhere else"? The bats peculiar to and confined to each of these distant islands must have originated within the islands to which they are indigenous and nowhere else.

Confined to the Old World only we find the genus *Pteropus* ("flying fox" type of bats) resembling the *Canidæ* about the head and face.

Confined to the New World only we find the *Noctiliones leporinus* (South America), a "flying rat" type of bat, so closely resembling the dentition characteristic of the rodents that Linnæus removed them from the bats and placed them among the rodents!

• Incidentally, this affords a good illustration of the little worth of "dentition" as a guide to "descent from a common ancestor".

These rodent-like bats of the New World are interesting as composite rodent-chiroptera types having no relationship with either the *Rodentia* or the *Chiroptera* of South America.

They show that "structural affinity" is no criterion of "common parentage", and that the many South American species of *Rodentia* and *Chiroptera* likewise

are merely *unrelated repetitions* of the rodent and bat types.

Descent of all the South American *Rodentia* from a rodent "common ancestor" of the region is out of the question. The numerous rodent types there are too diversified, as in the case of the kangaroo types of Australia.

The conspicuous preponderance in South America of all kinds of *Rodentia*—extending even to a composite rodent-bat—can only be explained by some specific chemical character in the primordial protoplasm of the region. "Each organism is characterized by a definite form which is determined by definite chemical substances," says Professor Loeb.

It is a significant fact that among the bats there are more instances of "aberrant genera" than in any other order of the mammalia!

This is precisely what we might expect to find, since there are (more than in any other order of the mammalia) *numerous unrelated evolutions* of bats in many regions, and *many isolated islands*, each containing its one or two "aberrant" species possessing peculiar generic characters found nowhere else.

Island Birds

Although many species of birds are known to make seasonal migrations by crossing such arms of the sea as straits and channels, the great majority of birds remain strictly confined to certain islands and continents, and it is with these we have to deal in the question of their origins.

It may be here laid down as a proposition generally true that all species of birds strictly confined to certain islands only, and *found nowhere else in the world*, have

been evolved, *ab initio*, upon the islands to which they are indigenous.

There can be no stronger evidence of the truth of this than is shown by the land-birds of Bali and Lombok, whose extreme *unlikeness* shows that they have been evolved, *ab initio*, upon the islands to which they are indigenous, although only separated by some 15 miles of sea.

Moreover, the birds of Bali and Lombok clearly show that the land-birds of isolated islands never cross the sea to go elsewhere. The land-birds of the several Galapagos Islands, lying within sight of one another, tell the same story.

So that the birds of Bali and Lombok, as well as those of the Galapagos Islands, furnish strong evidence of *local origin*, which may be safely applied to the land-birds strictly confined to all other isolated islands.

It is as well just here again to bear in mind Darwin's remark that it is a "deeply-seated error" to suppose that the "physical conditions of a country are the most important for the inhabitants".

Nevertheless, this "deeply-seated error" *continues* to be the stock Darwinian explanation of peculiar island birds, as the *locally* "modified descendants" of ancestors which have flown to the islands from "somewhere else".

For proof that this is a deeply-seated error we need not look further than the differing species of the Galapagos Islands, where Darwin was constrained to admit that the "physical conditions" do not differ so as to explain the differing species of each island.

Also the thirty-five differing species of lemurs on the island of Madagascar, where likewise the "physical conditions" do not differ.

This "deeply-seated error" is further exposed by

Darwin himself when he remarks elsewhere : “ We shall see this more clearly when we treat of the present distribution of organic beings, and find how slight is the relation between the physical conditions of various countries and the nature of their inhabitants.”

Strip the Darwinian theory of this—its stock explanation of “ modification ”—and what explanation is left to account for the thousands of species of *peculiar* island birds and bats found nowhere else ?

Let us, then, remember that whatever else may be the explanation it is certainly not the “ physical conditions ” on the islands.

Out of some 500 species of Australian land-birds there are approximately 250 species *strictly confined to Australia*.

This fact is sufficient proof that not one of these 250 species has ever, during millions of years, crossed the narrow Torres Strait separating Australia from New Guinea, just as not one of the 300 species strictly confined to New Guinea has ever, during millions of years, crossed this strait to go to Australia. All these species can only have been evolved in Australia and New Guinea respectively and nowhere else.

The trenchant division between the later elevated Australian region and the more ancient conterminous Indian region—separated as we have seen by the narrow strait between Bali and Lombok—is shown in the quite distinct types of the birds of these two regions, the only explanation of which is that these two regions have, on the whole, been elevated during different geological periods.

For instance, there is a complete absence from the Australian region of the bulbuls (*Ixidæ*), which are so marked a feature in the avifauna of the greater part of Asia and Africa.¹

¹ *Encyclopædia Britannica*, 9th edition.

Other Asiatic types also conspicuous by their absence from the Australian region are the berbet, the *Phyllornithidæ*, the vultures, pheasants, thrushes, and woodpeckers, of which only some four or five species (out of more than 300 Asiatic and Indian regions) only just cross the Bali-Lombok boundary line, and are found in Lombok, Celebes, or the Moluccas; but are entirely absent elsewhere in the Australian region, where doubtless these Indian region types of birds have not been evolved.¹

On the other hand, there is found in the Australian region only one species of bustard—a type which is entirely absent in the whole of the wide region between Australia and India.¹

There can be no relationship between the Indian and Australian bustards—probably they are products of different periods and regions. The *Ratitæ* of the Australian region, too, are entirely absent from the Indian region.

The *Ratitæ* found on such isolated islands of the Australian region as the Solomon Islands, Aru Islands, Jobie Island, New Britain, New Guinea, Ceram, and Australia, being all flightless birds which could no more cross seas and oceans than could mammals, must be all unrelated island species of the region.

So no doubt, too, are the two distinct species of emu in Australia itself. The close resemblance between the extinct Tasmanian emu and one of the existing Australian species counts for no more than that between the cassowaries of the Solomon Islands and those of New Britain Island.

Nor can there be relationship between such distinct, as well as geographically widely separated members

¹ *Encyclopædia Britannica*, 9th edition.

of the flightless *Ratitæ* as the ostrich of Africa, the rhea of South America, the cassowaries and emus of the Australian region, and the various species of extinct wingless *Dinornis* of New Zealand.

Indeed, that distinctiveness which has called for the classing of the *Ratitæ* as a sub-class of Aves is not more definite than is the distinctiveness between the merely flightless and the completely *wingless* groups of the *Ratitæ* which, no doubt, have been developed from distinct reptile groups and these from distinct groups of Palæozoic freshwater fishes and amphibians.

The supposed "rudimentary wings" of the New Zealand apteryx (and also of the extinct wingless *Dinornis*) are most probably the disused and degenerated forelegs of their reptilian ancestors—never used as wings at all.

Had the apteryx ever developed true flight wings and the power of flight, and lost it by disuse of its wings (as supposed by Darwin), the fully developed flight wings of a bird (used for ages) could never in the time have so completely degenerated and disappeared as have the supposed wings of the apteryx.

Moreover, the advantage resulting from the power of flight is so great and so obvious that no species of bird which had once acquired the power would ever give up the use of its wings. Why should it? It is nothing short of absurd to suppose so. To begin with, the bodies of the *Ratitæ* are too heavy for flight. Their wings would require to be very large to lift and carry their bodies through the air, hence they have never developed flight wings by *use*. Besides, the loose texture of their feathers would prevent any of the *Ratitæ* from acquiring the power of flight, even if their wings were each to be 10 feet in length.

The fact, too, that the supposed rudimentary wings

of the apteryx terminate in rudimentary claws points rather to their being, not the degenerated wings of a bird, but the rudimentary fore-limbs of an upright walking reptilian ancestor, like the *Ornithoscelida* reptiles, or *Compsognathus longipes*, for instance.

The loss of its supposed wings by disuse naturally was Darwin's only explanation of its wingless condition, since he believed that the ancestors of the apteryx could only have got to New Zealand by flying from "somewhere else".

Darwin got over the difficulty of accounting under his theory for the comparatively "primitive" character of the New Zealand fauna and flora by supposing that New Zealand *may* at one time have been connected with some purely hypothetical land surface somewhere in the Antarctic regions, from which it may have become stocked in a remote past! Where *that* was stocked from does not appear to have concerned him.

This suggestion has within it two time-worn Darwinian misapprehensions: (1) Highly improbable "former connection" of land, (2) the regarding of "primitive forms" as the *most ancient* instead of the *most recent* in their class.

The same misapprehension is seen in the case of Australia—(1) its supposed remote "former connection" with somewhere or other, (2) its supposed *oldest* mammalia, instead of *youngest* mammalia.

The weak point in Darwin's New Zealand theory is that if this were really the case the fauna and flora of New Zealand should be among quite the most highly developed types in the world, whereas the reverse is actually the case.

Not alone is it highly improbable that New Zealand has ever been connected with land in the Antarctic regions, but the general evidence is against its ever having been connected with Australia.

Australia, for instance, is endowed with abundant species of both marsupials and snakes, whereas New Zealand does not possess a single species of either. The fossil bone found in Australia of a large extinct *Ratite* bird of the *Dinornis* type is no more evidence of relationship with the New Zealand birds of the *Dinornis* type, or of "former connection" between New Zealand and Australia, than between New Zealand and all the other islands with *Ratite* birds.

The Honeysuckers of the Australian Region

When we find species of a particular genus to be prevalent throughout the scattered islands of any oceanic region, and especially when the various species on each island are entirely distinct and strictly confined to each island—as in the case of the honeysuckers and *Ratitæ* of the islands of the Australian region—we have here, not evidence of "descent from a common ancestor" of the region, but of specific chemical character in the protoplasm of the region. As with the *Ratitæ* so with the honeysuckers, the various species are confined to certain islands only of the Australian region.

There is only one species of honeysuckers (*Ptilotis limbata*) out of the abounding genera and species in the islands of this region, which in the ages past appears to have crossed the narrow strait dividing the Australian region from the Indian—crossing from Lombok on the Australian side of the strait to Bali on the Indian side.

This solitary instance out of the abounding species (extending over a vast period of time) affords strong evidence that the various species of honeysuckers

strictly confined to the far more widely separated islands of the region (than are Bali and Lombok) have not gone from one distant island to another in the past, but are *unrelated repetitions of the type*, evolved upon each of the islands on which they are found.

That this is so is confirmed by the distinct differences existing between the species and genera of the various islands of the region.

Especially is this the case with the honeysuckers of the Sandwich Islands (included in the Australian region), which are characterized by the quite extraordinary form of their bills—entirely distinct from those of any other honeysuckers of this region—or, in fact, of any other part of the world. So distinct are the honeysuckers of the Sandwich Islands that they may be found to form a separate section of the family, if not an entirely distinct family! ¹

Indeed, so strongly marked is the individuality of the avifauna of the Sandwich Islands that, as in the case of the Galapagos Islands, it has been suggested worthy of being ranked as a separate sub-region rather than as merely a province of Polynesia.

It would be no explanation to account for the strong individuality of the avifauna and flora of the Sandwich Islands by the Darwinian theory of “modification” as the result of the “physical conditions” of the islands, which the species of the Galapagos Islands showed Darwin to be a “deeply-seated error”.

The fact that the Sandwich Islands contain a greater proportion of *peculiar* species and genera than any other group of islands in the Australian region is inexplicable by the theory of “common parentage”.

The only explanation which may at all meet the

¹ *Encyclopædia Britannica*, 9th edition.

facts is that the islands of this group, like those of the Galapagos group, owing to their remote isolation, entirely aloof from any other island or continent, would therefore most probably have consisted of early rocks chemically unlike those of any other island or continent.

So that the protoplasms originating in the islands, under freshwater conditions, would likewise have differed in their chemical constitutions from the protoplasms of other regions, hence the marked regional modifications seen in the fauna and flora of the Galapagos and Sandwich Islands, the species of which differ more from those of the rest of the world than they differ from one another in the different islands of the group.

The Sandwich and Galapagos Islands, by their very aloofness from other zoological regions, bring into clearer perspective the fundamental connection between the *region* and the *specific modifications* of world-wide types in the fauna and flora of the region.

On a wider scale we see the same thing in the regional modifications of types in the different continents and zoological regions.

Indeed, the same thing is distinctly seen in the birds of Australia and New Guinea, both of which regions are conspicuous for *abnormal modifications* of Passerine types.

New Guinea Birds

The island of New Guinea is the home of the birds of paradise, which are examples of singular *regional modification* of two distinct Passerine types—the crows and the hoopoes—to neither of which can they be related.

The birds of paradise show characters akin to the bower-birds of Australia, which are also examples of singular regional modifications of Passerine types.

Some of the indigenous birds of New Guinea possess "Malayan affinities" (entirely absent in the birds of the intervening Moluccan province) which do not prove "relationship" between these New Guinea species and the birds of the Malayan region which they resemble. "Structural affinities," it should be remembered, can exist without "relationship".

In New Guinea there are some eleven types of birds of paradise and more than twelve other genera of land-birds, peculiar to New Guinea only, and which are entirely absent from the adjacent Moluccan province. On the other hand, there are twelve genera of "Indian region" types of birds found in the Moluccan province which are entirely absent from New Guinea.

These facts seem to indicate that although the Moluccas geographically lie within the Australian zoological region they probably belong in *time* to the earlier elevated "Indian region". This is corroborated by the further fact that most of the birds of the adjacent Moluccan province are *extremely unlike* their representatives in New Guinea, which caused A. R. Wallace to conclude that the Moluccan province cannot be a disconnected "old portion" of New Guinea—a quite reassuring rejection of the prevalent "former connection" idea!

Honeysuckers of Java and Borneo

There are some eight families of "Indian region" types of honeysuckers which are exceptionally prominent in the islands of Java and Borneo, and yet

are practically absent in the *nearly intermediate* province of Celebes.

We have seen that only a single species of Australian region honey suckers during probably millions of years crossed the narrow strait from Lombok to Bali.

We may infer from this long-extended test of the extremely *local* instincts of the honey suckers that the "Indian region" types found in Java and Borneo are species which have been evolved in these islands, and have not come from anywhere else, showing firstly that the islands of Java and Borneo fall within the Indian region of earlier elevation and, secondly, that Celebes does not. The latter island (as elsewhere pointed out) has probably been elevated at some period later than that of the Indian region, but earlier than that of Australia. It does not follow that all the islands of the Australian region have been elevated at the same time, nor even all the islands of the Celebesian province.

In the Celebesian province (conterminous with the Moluccan) there are approximately eight genera and sixty-five species of birds peculiar to, and *strictly confined to the main island*, in which, no doubt, they have originated.

Galapagos and Sandwich Island Birds

The Galapagos and Sandwich Islands, next to Australia and New Guinea, furnish the most marked examples of singular *regional modifications* of Passerine types of birds. For instance, three out of four of the *Passeres* genera of the Galapagos Islands are so *altogether peculiar* that it can only be said that they *appear* to come into the *Emberizidæ*—the so-called buntings of the Old World.

Not only the quasi-buntings of the Galapagos Islands, but many other so-called "buntings" and "finches" of the New World do not conform to the classification features of the buntings and finches of the Old World. The so-called buntings and finches of the New World, therefore, cannot be related by "common parentage" either to each other or to these groups of the Old World. They can only be instances of *unrelated* type repetition in the New and Old Worlds.

In the Passeres of the Galapagos Islands there are, however, a few notable exceptions to the generally distinctive peculiarities seen in nearly all the species. There are three species which are said to closely resemble species in South America, and have by some been considered to be quite distinct species, while by others they have been considered local races.

If these three Galapagos species be considered the same species found in South America, then they would have to be explained as "survivals unchanged"—leaving the marked peculiarities of all the other Galapagos species unexplainable.

On the other hand, these isolated resemblances to South American species are quite naturally explainable as *unrelated* type repetition in South America and the Galapagos Islands.

Polynesian Island Birds

Space does not permit of more than a few general remarks concerning the indigenous birds of the various scattered Pacific islands, commonly known as Polynesia, and falling within the Australian region elsewhere outlined.

In these islands, as in all isolated islands, we find peculiar genera strictly confined to certain islands only,

while in other cases we find abrupt discontinuous distribution of certain genera, all of which facts are evidence of *regional* evolutions of species.

Let us, then, take just one Polynesian instance : there is a reed-warbler found in the Palau Islands only and not in any of the other islands of the Polynesian region.

Being absent from all the other islands of this region, but being of the same widespread type (*acrocephalus*) to which the English and Australian warblers belong, the warblers of the Palau Islands can only be examples of *unrelated type repetition* at distant points.

Indian Ocean Island Birds

Turning now to the isolated islands of the Indian Ocean, the largest and most important of which is Madagascar, we find that nearly half of its more than 200 species of birds are *peculiar to that island only* !—with the huge continent of Africa only 240 miles away !

Many of these Madagascar species, moreover, are remarkable for their distant resemblances !—some of them being so *altogether distinct* that they can hardly be classified !—and continue to be a puzzle to know where to place them.

This can only mean that all these *very peculiar species, found nowhere else*, have been evolved upon the island of Madagascar and nowhere else.

We come now to the smaller islands of the Indian Ocean, whose indigenous birds curiously seem, for the most part, to have become extinct.

Chief among these islands is Mauritius, the one-time home of the famous, now extinct, dodo. " Extinct as the dodo " has become a proverb wherever the English language is spoken. The ill-fated dodo was

a flightless bird of the pigeon type—and *found nowhere else!*

To the southward of Mauritius lies the small isolated island of Reunion, where once existed the now extinct *Solitaire* of Reunion, another flightless bird of the pigeon type, akin to the extinct dodo, but *quite distinct and found nowhere else!*

Far to the eastward of Mauritius lies another small isolated island called Rodriguez, where once existed the now extinct *Solitaire* of Rodriguez, yet another flightless bird of the pigeon type, also akin to the extinct dodo, but so *altogether distinct* that it constitutes a genus by itself—and is also *found nowhere else!*

The flightless character of all the species, the complete isolation of all the islands, and, though the birds are all of the pigeon type, the specific differences between the species of each island show that these flightless *Columbidæ* can only be the result of some specific chemical character in the primordial *protoplasm of the region* and are, therefore, *unrelated repetitions of a type peculiar to the region.*

West Indian Island Birds

We now pass on to the avifauna of the Antilles—the chain of Atlantic islands commonly known as the “West Indies”, concerning which a few general remarks must here suffice.

The Antilles being, at certain points, by no means remote from the adjacent continents of North and South America, the avifauna of this chain of islands, instead of being—as may be supposed—a mixture of that of both these continents, *greatly differs from that of both!*

This can only mean that the indigenous birds of this chain of islands are of *local origin*, and have to be regarded as species evolved upon the islands to which they are strictly confined, even if, like the reed-warblers of the Palau Islands, they closely resemble genera found at other distant points.

Island Land-shells

The fact that land-shells and their eggs are killed by sea water, and that the indigenous island species have always kept strictly within each island, and have never been found anywhere outside these islands, is proof enough that they have been evolved upon the islands on which they are found indigenous.

Even those species which are supposed to be the same species "found elsewhere" are more likely species evolved on the islands, merely resembling species "found elsewhere".

After most improbable speculations as to how the eggs of land-shells may have got from continents to isolated islands, Darwin quotes the fact, drawn to his attention by Sir C. Lyell and Mr. Wollaston, that certain species of land-shells indigenous to the adjoining islet of Porto Santo have never gone to Maderia, in spite of the fact that these species live in crevices of stone, and large quantities of stone are annually transported from Porto Santo to Madeira.

This long-extended test case may be set against Darwin's speculations as to how the eggs of land-shells *may* have been transported across hundreds and thousands of miles of ocean to many remotely isolated islands.

The fact that the indigenous species of an islet so near to Madeira has never got to Madeira *by any of the means*

supposed by Darwin, proves the groundlessness of those speculations, while making the evidence more conclusive that all the species found indigenous in the many isolated islands have been evolved upon the islands, and have not been transported thither from "somewhere else".

Like the peculiar island bats and birds, the peculiar island land-shells seem only to have travelled from continents to islands—never from islands to continents, or from island to island !

Island Flora

Referring to endemic island flora, Darwin remarks generally : " Although in oceanic islands the number of kinds of inhabitants is scanty, the proportion of endemic species (i.e. those found nowhere else in the world) is often extremely large." Precisely what we should expect to find if the endemic species are species of island origin.

Again he remarks : " In the plants of the Galapagos Islands Dr. Hooker has shown that the proportional numbers of different orders are very different from what they are elsewhere. Such cases are generally accounted for by the physical conditions of the islands, but this explanation seems to me not a little doubtful."

The explanation of these differences as due to " the physical conditions of the islands " is not only " not a little doubtful ", but Darwin himself, as we have seen, has laid it down as " a deeply-seated error ".

It is, I believe, not a matter of " the physical conditions of the islands "—as even Darwin doubts—but (for reasons elsewhere referred to) of specific chemical character in the early rocks of the Galapagos Islands, causing modifications in the chemical constitution

of the protoplasms from which the Galapagos plants have been evolved. So that the local species exhibit not alone peculiar genera, but also the further peculiarity that they have not followed the usual proportional numbers of different orders found in other parts of the world—evidence of the *local* origin of the Galapagos flora.

The Galapagos flora, and also its fauna, clearly show that it is by no means generally true, as maintained by Darwin, that the fauna and flora of isolated islands are allied to those of the nearest mainland.

We have seen, too, that the indigenous birds of the West Indian Islands, instead of being a mixture of those of the adjacent continents of North and South America, are *extremely unlike* those of either continent.

An exceptionally marked refutation of this idea is seen in the *extreme unlikeness* of the indigenous birds and mammals of Bali and Lombok, separated by only 15 miles of sea.

The indigenous birds and plants of the Sandwich Islands are altogether unlike anything found on the nearest mainland (North America).

The indigenous birds of the adjacent Moluccan and Celebesian islands are altogether different.

The indigenous fauna and flora of Madagascar, and especially its avifauna, are altogether different to anything found on the nearest mainland (Africa). In the *chloenaceæ* of Madagascar, for instance, we find an entire natural order of plants confined to Madagascar only, and quite unknown on the African mainland!—or anywhere else in fact.

The flora of Kerguelen Island (southern Indian Ocean) more resembles that of America than Africa, though the island lies nearer to Africa than to America.

Though "former connection" of this remote island with America is out of the question, probably the greater resemblance between the Kerguelen and South American floras is due partly to chemical affinity, and partly to greater coincidence between the periods of elevation of Kerguelen Island and South America, than between the periods of elevation of Kerguelen Island and Africa.

The Madeira Flora

The existing flora of Madeira, it has been pointed out by Darwin on the authority of Oswald Heer, resembles the extinct Tertiary flora of Europe.

The fact that the existing flora of Madeira still possesses a Tertiary character, while that of Europe has lost it, goes to show that the existing flora of Madeira is a *younger* flora than that of Europe, which means that the island of Madeira is of more recent elevation than the continent of Europe, and its flora independent and later evolutions.

The Tertiary character of the Madeira flora cannot be attributed to "survival unchanged" while leaving unexplained the reason why the Tertiary flora of Europe has not also "survived unchanged".

The New Zealand Flora

It has been elsewhere pointed out that (lying as it does in the Australian region of later elevation) the indigenous flora of New Zealand has a "primitive" cryptogamic character generally. Ferns, and other primitive types of flowerless plants are in great variety—features pointing to a flora of comparatively recent origin.

Out of some 1,000 species of New Zealand flowering plants, about three-fourths are peculiar to it. Of most of those not peculiar to New Zealand, some have Australian, some South American, Polynesian, European, and Antarctic "affinities".

Since New Zealand could never, at any time in the past, have been connected with all these widely separated regions, these various "affinities" cannot be due to "former connection".

Besides, had New Zealand ever been connected with all these widely separated regions, its indigenous *fauna* should certainly consist of the same species and genera found in all these widely separated regions. Instead of which there is not a single species of New Zealand animal found in any of these regions, nor a single species of animal of any of these regions found in New Zealand. Indeed, the indigenous fauna of New Zealand is most conspicuously *unlike* that of any of the regions named, or indeed of any other region of the whole world.

The "structural affinities" between the plants of all these widely separated regions, and those of New Zealand, can only be the result of "chemical affinities" in the chemical constitutions of their primordial protoplasms.

CHAPTER VII

SPECIES AND STERILITY

Right here I wish it to be clearly understood that the remarks made in this chapter with regard to "varieties" and "species", "sports" and "mutations", "fertility" and "sterility", refer to the animal kingdom only.

Plant and animal life are two fundamentally distinct forms of life from protoplasm upwards. So that even if a distinct plant species could arise from an individual "sport" or "mutation", it is an unsound inference to suppose that animal species can do the same, for reasons referred to further on.

It is not too much to say that the indiscriminate treatment in biology of plant and animal life, and the drawing of important and far-reaching conclusions from the phenomena of plant life and applying them to the animal kingdom must, to this extent, lead to an unsound biology, especially where there is no parallel between plant and animal life.

We are told that science finds it difficult to draw a hard and fast line between plant and animal, but this refers to organisms in the lowest single-cell stage—which are practically mere specks of protoplasm.

As we approach the earliest stages of all life—plant and animal—we should expect to find them converge more and more towards a common elementary form, which does not necessarily mean a common origin.

So that, however indistinguishable plant and animal life may be in their lowest forms, the difference between

plant and animal becomes very great as they ascend in the scale of their development. No difference could be more "hard and fast".

This difference has not begun by "divergence" anywhere along the line of their ascent, but must have begun in the specific chemical constitution of their respective protoplasts.

The difficulty of distinguishing between plant and animal life in their lowest forms has led to the general inference that plant and animal have "diverged" in their early stages from a "common ancestor", and that therefore their reproductive processes are the same, and fertility and sterility between species the same in both—an unsound inference as will be pointed out further on.

Much obscuration of the subject has been caused by Darwin's indiscriminating references to sterility and fertility in plant and animal species.

Not only is there no comparison between plant and animal species in respect of sterility and fertility, but likewise no comparison as regards their abilities to preserve and perpetuate "sport" characters. These important differences between them are usually overlooked.

Individual plants remain during the whole period of their lives rooted to one particular spot, so that when a plant "sport" sheds its seeds there would spring up in the same neighbourhood many other individuals having a tendency to the same chromosome variation as the parent plant. These again would either fertilize one another or, if of the self-fertilizing type, would fertilize themselves, and in turn shed their seeds in the same neighbourhood.

Self-fertilization in plants, in effect, ensures all the conditions of rigid *isolation and selection* necessary for

the preservation of "sport" characters—conditions entirely absent in nature in the case of animal "sports".

In this way plant "sports"—quite unlike animal "sports"—are able to establish "starting points" consisting of groups or clusters of individuals possessing a particular chromosome variation, and from which centres, by a steady process of spreading in all directions, they would be able to extend until they have attained a distribution entitling them to be ranked as separate varieties. Such a process, of course, is utterly impossible in the case of animal "sports" under natural conditions.

Individual animal "sports", on the contrary, would roam from place to place, and seldom, if ever, produce offspring by a "sport" individual of like variation and opposite sex, and even if so unlikely a coincidence were to take place, the "sport" character would inevitably become swamped by continued intercrossing with normal individuals.

The artificial production of domestic breeds of animals clearly shows that "sport" characters can only be preserved and perpetuated by the *strictest selection and isolation of "sport" individuals for many generations*—conditions, it is important to remember—utterly impossible under natural conditions.

Laboratory experiments, such as splitting the chromosomes, and changing the Mendelian characters of the chromosomes of the germ-cells by X-rays, are merely instances of artificially produced abnormalities or "sport-mutations". Nor are they nature's methods, and herein lies the little worth of laboratory experiments generally, as affording evidence with regard to biological processes under natural conditions.

Laboratory experiments generally, therefore—especially those with plants—afford no valid grounds upon which to base “mutation theories” of the natural evolution of animal species.

The so-called inheritable “factor mutants” artificially induced under “experimental breeding”, even could they arise in animals under natural conditions, *cannot be preserved in nature*, as has been insistently pointed out. It is just here that all “mutation theories” of origin of species in animals utterly break down.

The fundamental dissimilarity between plant and animal in respect of their reproductive processes is plainly seen in the following instances.

While all the domestic breeds of animals artificially produced from the same species are invariably fertile one with another, there is at least one plant variety, if variety it be (Oe : mut. : Gigas) whose chromosome instability is so extreme, that it refuses to cross with its own species—a thing unparalleled in the animal kingdom.

Indeed, there are many other instances of extreme chromosome eccentricity in plant species, wholly unparalleled in the animal kingdom, to a few of which Darwin refers as follows: “There are individual plants of certain species of *Lobelia*, and some other genera, which can be far more easily fertilized by pollen of another and distinct species, than by their own pollen. . . . So that certain individual plants, and all the individuals of certain species, can actually be hybridized more readily than they can be self-fertilized !”

Darwin then sums up in the following indiscriminating way, which might be taken to refer to both plants and animals: “It can thus be shown that neither

sterility nor fertility affords any clear distinction between species and varieties." He is here arguing entirely from the behaviour of plants.

Now, as Darwin must have known, all animal species are invariably *sterile inter se*, or produce hybrids invariably sterile sooner or later. In no case is there indefinitely continued fertility between the hybrids.

Could anything more clearly show how erroneous is the supposition that analogy exists between plant and animal species in respect of fertility and sterility, and to treat plant and animal in a generally indiscriminating way?

The whole theory of the derivation of species from species by "spontaneous variations" and "natural selection", as put forward by Darwin, rests upon the fundamentally unsound assumption that, because so-called "varieties" of domestic animals can after many generations of careful *selection and isolation* be artificially produced by man from "spontaneous variations", *theoretically* nature could do the same by so-called "natural selection".

There can be no greater misconception upon a vitally important point.

When a breeder wishes to preserve any "spontaneous variation" which in his opinion it is desirable to preserve, he takes special care that this particular variation is not lost or neutralized by intercrossing with the general herd. Such variations can only be preserved by many generations of most careful selection, mating, and special isolation of individuals possessing *like* variations—*indispensable conditions entirely absent in nature.*

Darwin himself shows how extremely difficult it is, even under such special conditions, to produce an artificial breed of domestic animals. In this

connection he remarks: "Not one man in a thousand has accuracy of eye and judgment enough to become an eminent breeder. If gifted with these qualities, and he studies his subject for years, and devotes his lifetime to it with indomitable perseverance, he will succeed, and may make great improvements; if he wants any of these qualities, he will assuredly fail."

This ought to show the reader—ought to have shown Darwin—how utterly impossible it would be for nature, in the *absence of systematic isolation and conscious selection of individuals*, to produce "natural varieties" from "spontaneous variations!"

In support of this unsound analogy, Darwin puts forward another equally unsound. He quotes what he calls "*unconscious selection*" resulting from every breeder trying to possess and breed from the best individual animals.

Now, as a matter of fact, this is not "unconscious" selection at all. It is nothing more or less than *conscious selection* practised on a wide scale by all breeders desiring improvement of form in a *definite direction*. It is entirely misleading to call this "unconscious selection". Any theory based upon unsound assumptions and analogies of this kind must inevitably be unsound itself—unsound at the core. Driesch considered the Darwinian theory a failure.

In Driesch's opinion "Darwinism is (like Hegel's philosophy) the delusion of a generation".¹

The botanist Naegeli rejects Darwin's theory of "natural selection" altogether.

The following remarks were made by Professor Watson in his address as President of the Zoological Section of the British Association in 1929, in which he

¹ Haeckel's *The Wonders of Life*.

said : " The only two theories of evolution which have gained any general currency, those of Lamarck and Darwin, rest on a most insecure basis ; the validity of the assumptions on which they rest has seldom been seriously examined. . . . The present position of zoology is unsatisfactory."

Darwinian zoology certainly is unsatisfactory. It is however, not correct to bracket the name of the immortal Lamarck along with Darwin in the matter of the unsatisfactory character of zoology as it stands.

The great Lamarck as a matter of fact stands alone as the real founder of the Doctrine of Evolution (" descent with modification ").

Darwinism, as such, consists of the greatly over-estimated theory of " natural selection ".

Unless " spontaneous variations " profitable to the organism can, under *natural conditions*, be preserved by effective isolation of individuals possessing them, it is obvious that so-called " natural selection " has nothing to work on.

It is all very well to suppose that natural selection " selects " individual variations " profitable to the organism ", but such variations have got to be preserved to be " selected ", and unless they can be preserved when rarely they do occur (*by strict isolation of individuals possessing them*) the theory of " natural selection " is purely fanciful as regards the " derivation ", or even " survival " of species by its agency.

Even if it were possible for some *slight individual variation*, " profitable to the organism," to be preserved under natural conditions, it is the height of imagination to suppose that only those individuals possessing it could " survive ", while all those that

do not possess it would therefore become extinct ! Yet this, in essence, is the theory of "natural selection".

Romanes, perceiving the inherent weakness in the Darwinian theory, recognized that some other agency must be introduced before "natural selection" could be credited with producing "natural varieties" from purely "spontaneous variations". He therefore put forward the specially improvised theory of "natural isolation by geographical barriers", etc.

In the first place, the chances would be most remote that two individuals of opposite sex would happen to possess a *like* "spontaneous variation". In the second place that, under the haphazard conditions in nature, they would happen to find themselves thrown together, and *they and their offspring only* effectively isolated from all other individuals of the species.

The possibility of such a combination of fortuitous circumstances being so infinitesimal, and the number of distinct species in every zoological class so enormous, that *would have to be thus accounted for*, that we may dismiss the supporting theory of Romanes which, it seems to me, leaves the Darwinian theory in no better predicament.

The difficulties inherent in the Darwinian theory of the origin of species have been thus summarized by Romanes: "As a theory of origin of species, natural selection has in its way three cardinal difficulties—(1) the difference between species and varieties in respect of mutual fertility, (2) the swamping effects of free intercrossing upon an individual variation, (3) the inutility to species of so large a proportion of specific distinctions."

But the greatest difficulty of all, fatal to the theory, namely, absence in nature of *conscious selection* and

isolation of "sport" individuals, is overlooked by Romanes!

Fechner, of Germany, very rightly considered that Darwinism attributed too much to "accident".

"Sports" or so-called "mutations", being in all cases mere phenomena of *abnormality*, are placed out of court as stable evolutionary factors. "Mutations" (now so-called) are merely "sports" in disguise.

Were "sports" able to be preserved under natural conditions, being from their very nature *variations in different directions*, they would inevitably tend to disintegration of type.

The fact that "species character" is, and always has been, absolutely *defined*, is proof that "sport" characters are not, and cannot be, preserved under natural conditions.

It appears to be tacitly assumed that the derivation of species from species has been conclusively proved by Darwin. This is by no means the case.

Nothing can more clearly reveal the want of evidence upon this important point than the fact that the late Professor Haeckel spent several years in special research work among such lowly and profusely evolved marine species as the Sponges, trying to establish some kind of satisfactory evidence of the derivation of species from species.

Darwin, on the other hand, was forced to resort for evidence in support of the theory to the obviously ill-founded idea, apparently originated by Pallas, that, as Darwin puts it, "Most of our domestic animals have descended from two or more wild species, since commingled by intercrossing."

It is surprising to find Darwin add that, "On this view, the aboriginal species must either at first have produced quite fertile hybrids or the hybrids must

have become, in subsequent generations, quite fertile under domestication."

As Darwin surely must have known, both these alternative suggestions by him are contradicted by daily experience to the contrary. Nay, they are demonstrably false—as indeed Huxley's famous "hiatus in Darwinism" very clearly shows.

But we need to go no further than Darwin's own, no doubt, carefully considered statement that, "I doubt whether any case of a perfectly fertile hybrid animal can be considered as thoroughly well authenticated." Yet he accepts the Pallas idea without demur!

Darwin himself assists in exposing the falsity of both his own suggestions put forward above, for he has elsewhere remarked: "I have more than once alluded to a large body of facts, which I have collected, showing that when animals and plants are removed from their natural conditions, they are extremely liable to have their reproductive systems seriously affected. *This in fact is the great bar to the domestication of animals*" (italics are mine). How, then, could the *naturally sterile* hybrids between two distinct species "become quite fertile under domestication"? Could anything more completely refute the Pallas idea, as well as Darwin's own suggestions in defence of it?

Thus, on Darwin's own showing, as well as the notorious fact that there is not a single known instance of indefinitely continued fertility between the hybrids resulting from crossing two distinct species, we may, without hesitation, dismiss the Pallas idea as groundless.

The limits of hybridization between two distinct species holds good not alone in animals but in plants.

For instance, in plants, while hybrids can be produced even between two distinct genera, there is a limit to hybridization between distinct species.

“Hybrids have not the power of perpetuating their kind like naturally distinct species; for, though occasionally fertile in the second and third generations, they have never been known to continue so permanently. But though incapable of propagating beyond a limited period, the pollen of the parent species may be made to fertilize them, or their pollen to fertilize the parent; but in either case the new offspring gradually merges into the original species. Thus nature has wisely set a limit to the intermingling of species, by which they are preserved from ultimately running into confusion and disorder.”¹

No Derivation of Species from Species

There is no “natural variety” of animals which by “spontaneous variations” and “divergence” becomes a distinct species. Mendel’s experiments and the artificially produced domestic breeds go to show that this is impossible under natural conditions.

By the artificial selection and preservation of “spontaneous variations” we are merely, as it were, grafting an artificially produced *excrescence* or “modified character” upon the ancient stem-form of the species. So long as this artificial process of *deviation* from the ancient stem-form is continued by selective mating of individuals, the “modified character” grafted upon it will be maintained.

But when the process of artificial deviation from the stem-form of the species is discontinued, by crossing the individuals possessing the “modified character” back upon the stem-form, the hybrid progeny of this back cross, if left to interbreed among themselves, will

¹ Chamber’s *Information for the People*, vol. i, p. 80.

steadily revert to the stem-form of the species, whose prepotency will gradually obliterate the "modified character" artificially grafted upon it.

For instance, the Polled character of certain breeds of cattle is a "modified character" which has been artificially grafted upon the Horned or "stem-form" character of the species.

If we now cross back a Polled bull on a Horned (stem-form) cow, the artificially "modified character" (Polled) is only "dominant" in the first hybrid generation of the back cross. From the second hybrid generation onwards, if they be left to interbreed among themselves, the Horned (stem-form) character, at first "recessive", gradually asserts its greater prepotency. All those individuals in the later hybrid generations, which possess the Horned (stem-form) character, *always breed true inter se*, while those possessing the artificially "modified character" (Polled) do not always breed true.¹

Thus the Horned (stem-form character), "recessive" in the first hybrid generation of the back cross, gradually becomes "dominant" by always breeding true whenever it appears.

These facts go to show how impossible it would be for a "variety" so-called, even could it arise under "natural conditions", in the *absence of conscious selection and isolation* of "sport" individuals, to break away from the hereditary character of a species and "diverge" into a distinct species.

The Polled breeds of cattle, for instance, are not "varieties" in the Darwinian sense that they are "diverging" into distinct species, but are artificially "modified portions" of the Horned species, from

¹ J. Hanly, A.R.C.Sc.I., in *Farmers Weekly* (South Africa), 19th Jan., 1921.

which, as breeding experiments upon Mendelian lines show, they cannot break away and "diverge" into distinct species with loss of fertility *inter se*.

Hence, as we have seen, perfect fertility continues in the hybrids between the Polled and Horned portions of the species, until the Polled or "modified character", artificially grafted upon the "stem-form", is finally cast off. Refusal of "divergence" is here seen.

Continued fertility in the hybrids, with absolute refusal to *blend* the "modified character" with the "species character" (as seen in the Tall peas and Polled breeds of cattle) denote "modified portions" of species.

On the other hand, in crossing two *unrelated* species possessing chemical affinity in the chromosomes, there is *blending* of the two distinct species characters (as seen in the mule) but *sterility in the hybrids* is nature's bar here to *fusion* between two distinct species characters. Refusal of "divergence" is here again seen.

In very rare cases, however, female mules have been known to breed by crossing back with a horse. A quite unique case of this kind is reported to have recently occurred in which a female mule belonging to Mr. Killian, of Weenen, Natal, has produced two foals by crossing back with a horse stallion.

Further, a pure horse mare is said to be, at the present time, in foal to a hybrid mule stallion of the same particular family.

The above remarkable case shows that fertility between two individuals of distinct species varies according to the individual idiosyncrasies of the individuals crossed and the chemical affinity existing between the chromosomes of their germ-cells.

It should be noted that mule hybrids can only produce progeny when crossed back upon the pure horse. The hybrids themselves do not produce progeny *inter se*, showing the limitation of hybridization between distinct species.

The species of certain genera, however, such as *Homo* for instance, appear to possess a sufficiently close chemical affinity in the chromosomes of the germ-cells, to make possible more or less stable *blends* or "mixed races", by the infusion from time to time of one or other of the pure species into the mixed race.

"Modified portions" of a species (such as the Polled breeds of cattle) could only have come about by *conscious selection and strict isolation* of "sport" individuals for many generations.

In plants, however, "modified portions" of species (such as Mendel's Tall peas) can come about under "natural conditions", since *self-fertilization* in plant "sports", ensures all the conditions of *conscious selection and strict isolation*, so indispensable in the case of animal "sports".

No "Natural Varieties" of Animals

Darwin regarded the domestic breeds of animals as instances of artificially produced "varieties" in the Darwinian sense. This has kept going the idea of "natural varieties" and the "derivation of species from species" by "spontaneous variations" under natural conditions.

We have seen, and Darwin himself has shown, how impossible this really is in nature in the absence of conscious selection and strict isolation of "sport" characters.

All over the world there are numerous distinct species of animals inhabiting the same or adjacent regions, which, merely from their resemblance, are assumed to be "natural varieties", "geographical races", and "sub-species".

The very fact that they are closely similar, and although living in the same territory for ages past yet have never crossed (as is shown by the absence of endless hybrid gradations indiscriminately inter-crossing), is conclusive evidence that they are not "natural varieties", "geographical races", or "sub-species", but distinct, though closely similar species.

For instance, there are several species of snakes, *living in the same locality*, which so closely resemble one another in colour markings that it is difficult to distinguish between them, yet some species are extremely venomous and deadly, while others, closely similar, are quite harmless!

Were it not for this definite and decisive difference between them, they would no doubt be regarded as "varieties of but one species", especially since they are very similar and inhabit the same locality.

It is *choice of food*, and not "descent from a common ancestor of the region"—as supposed by Darwin—which will more than anything else account for similar species being found in the same or similar regions.

All over the world we find that similar species choose similar foods and, for this very reason, choose similar environments and have similar habits.

Among bird species especially, many have similar habits and similar "calls", and choose similar foods and environments. These facts have kept going the superficially based idea of "natural varieties" all over the world.

The important fact that they *never* cross with each

other, though living side by side under natural conditions, is obscured by an unquestioning, albeit an unproved, faith in the existence of "natural varieties". Since chemical affinity underlies structural affinity, possibly this may account for why similar species choose similar foods.

Choice of similar foods by similar species is strikingly seen in the ant-eaters. In the whole of this order, every species, wherever found, without a single exception, chooses the one and only food—ants.

In the many species of *Bacteria*, too, we find a decided predilection for food of specific chemical constitution—very marked in the *Bacteria* of disease, as is shown in their very particular choice of "host-species" both in plants and animals.

The closest structural resemblance cannot be taken as proof of the existence of "natural varieties".

For example, it was for a long time firmly believed that the reddish coloured sulphur bacteria consisted of a great number of closely linking "intermediate varieties"—so exactly alike are they in all except size.

However, Winogradsky¹ eventually proved, by means of pure culture tests, that each of these different forms found existing under similar conditions was specific and did not produce any of the other forms found under the same conditions, showing that similar species choose similar foods and environments, and may thus be mistaken for "geographical races", or "natural varieties".

Had it not been possible to prove the matter by actual test experiments, these numerous distinct species would no doubt still have been regarded as "natural varieties", merely because of their close resemblance and being found in the same environment.

¹ Loeb in *The Organism as a Whole*, chap. iii, p. 42.

There are some 700 species of butterflies found within a few miles around the town of Para, in Brazil.¹ It is among such profusely evolved types (in which many of the species must inevitably closely resemble each other) that naturalists seem to be attracted to seek for evidence of the derivation of species from species. These are the very types of which they have reason to be most suspicious and critical, as being those the most likely to deceive them into believing they have found what they are so eagerly looking for.

A well-known naturalist, searching among the profuse and closely similar species of Brazilian butterflies for evidence of the derivation of species from species, came upon two species in the same habitat so closely similar that he seems to have believed they were "parent species" and the "variety" from it—thus exemplifying the danger referred to.

Now, if we meet with two such cases, living side by side and maintaining their distinctive characters, the proof that they are two similar but distinct species seems to me to be complete.

Were they "parent species" and "variety" living side by side they could never, without rigid *isolation and conscious selection*, have developed distinctive characters, for they would have continued to intercross, and thus lose distinctiveness. No "variety" could even begin to exist as such, for it could not, under natural conditions, break away from the stem-form of the species, as the crossing of the hybrids between the Polled and Horned breeds of cattle goes to show.

This supposed discovery among the Brazilian butterflies of evidence of the "derivation of species from species", therefore, cannot be accepted as evidence of it.

¹ H. W. Bates in *The Naturalist on the Amazon*.

Darwin himself has pointed out that not one man in a thousand has accuracy of eye and judgment enough to produce even a distinctive breed of stock by *conscious selection and strict isolation* of "sport" individuals during a life-time. What chance would there be, under the haphazard mating in nature, for any butterflies to break away from the stem-form of a "parent species" (living side by side with them) sufficiently to become even a distinctive "variety"?

Had it been possible for the numerous species of Brazilian butterflies to have split off into "varieties", and these again into still more "varieties", the process would have broken down under its own weight, and all distinctiveness of species would finally have disappeared.

After five years of strenuous search among the profusely evolved species of the Sponges for the missing proof of the "derivation of species from species", Haeckel, like the naturalist among the Brazilian butterflies, believed he had found what he was looking for in the *Olynthus*, which, because the simplest form of the Sponge type, he believed to be the "stem-form" from which the very numerous species of sponges have been derived.

It is, I contend, an unsound biological principle to regard the *simplest existing form* in any class of organisms as the *oldest existing form* in its class.

The *Olynthus*, I believe, should be regarded not as the *oldest*, but as the *youngest* evolution of the sponge type, and all those gradational forms which Haeckel supposed to have been derived from it, and from one another, are distinct and older species according as they are more advanced in structures than the *Olynthus*.

The Sponges, like the sulphur bacteria, consist of a

great number of species so closely similar that it is difficult to distinguish between them.

Like the naturalist among the Brazilian butterflies, Haeckel was here, I maintain, misled into believing he had found evidence of the "derivation of species from species"—evidence by the way which is not yet forthcoming.

What is a Species?

"Species," as is shown by the "composite types" and the lesson of Australia, are merely *unrelated repetitions of a type*.

Under the theory of the polygenic origin of species there is no need to define just what constitutes a "species".

Under the Darwinian theory, however, which supposes that "species are hard and fast varieties", there does arise a need to define what constitutes a "species" as compared with a "variety", and how a so-called "variety" becomes a "species".

"Natural varieties" of animals arising from "spontaneous variations" are not required to account for species. They are, however, indispensable to the Darwinian theory.

Just why, or at what stage, a supposed "variety" becomes a distinct "species", and loses fertility with all other species of the same genus, has never been explained or proved, and still remains Huxley's famous "hiatus in Darwinism".

As an instance of uncritical assumption of the existence of "natural varieties", there are some species of Brazilian monkeys (owl-faced night apes and others) which live side by side in the same forests and never cross, yet, merely because they are very

similar in appearance, they have been assumed to be "varieties of but one species!"

The fact that, though living side by side for ages past, they have never crossed (shown by the absence of numerous closely linking intermediate hybrid forms) is clear evidence that they are not "varieties of but one species", but are distinct though very similar species, having no relationship from the beginning.

Darwin himself seems at times to have recognized that the theory of the "derivation of species from species" is at variance with a large body of facts, for he remarks: "a variety might arise in the natural course, differing from its parents, and the offspring of this variety might again differ from its parents in a greater degree; but this will never account for so habitual and large a degree of difference as that between the species of the same genus."

If these words mean anything, they mean that species cannot have been derived from other species, and beg the whole question that "a variety might arise in the natural course".

Again, he remarks: "Why, if species have descended from other species by fine gradations, do we not everywhere see innumerable transitional forms?" Why indeed! He continues: "Why is not all nature in confusion instead of the species being, as we see them, well defined?... Why do we not now find closely-linking intermediate varieties?"

Because we do not find these to-day, Darwin concluded that "they must have existed... embedded in the rocks". But they do not exist in the rocks either. For which Darwin blamed "the imperfection of the geological record".

What, then, are we to blame for their not being found to-day? It is merely shelving the difficulty to blame

the imperfection of the geological record, and leave it at that. The crucial point is why are they not found to-day?

If species were "hard and fast varieties", as supposed by Darwin, there should be no break in the continuity of a natural process, and numerous closely linking intermediate varieties should be found in *all* geological periods—whereas they are found in *none*!

This, it seems to me, is pre-eminently one of those cases in which we may safely read the past by the present.

That is to say, since closely linking intermediate varieties do not exist to-day, they never have existed. The truth of the matter I believe to be that there is no "derivation of species from species".

"The origin of species by descent with modification is as yet only an hypothesis. During the whole period of recorded human observation not one single instance of the change of one species into another has been detected; and, singular to say, in successive geological formations, although new species are constantly appearing, and there is abundant evidence of progressive change, no single case has yet been observed of one species passing through a series of inappreciable modifications into another." (Chambers's *Information for the People*. Article "Zoology".)

Degrees of Sterility between Species

Though all species are of distinct origin, the greater the degree of chemical affinity in the chromosomes of the germ-cells of any two species crossed, the more perfect would be the fusion between the ovum- and sperm-cells, and consequently the greater the degree of fertility between them.

In the great majority of cases there is no fusion at all between the ovum- and sperm-cells of two distinct species, while in others (as in the case of the mule) sterility sets in, in the first hybrid generation as a rule.

In certain exceptional genera, however, such as *Homo*—the Dog tribe and Cat tribe—there is a more than usually close resemblance between the species—the result no doubt of close chemical affinity between them.

In the groups named, so close a degree of chemical affinity exists in the chromosomes of the germ-cells of the different species as to make possible “mixed races” of mankind, and “mixed breeds” of canines and felines. Although the species of these groups readily cross, they are *distinct* species from the beginning.

In general, the greater the structural affinity, the greater the fertility between species, which shows that both “structural affinity” and “fertility” follow the curve of “chemical affinity”.

The degree of fertility varies even between the species of the same genus, according to the degree of chemical affinity existing in the chromosomes of their germ-cells. For instance, the German Spitz dog can be crossed with foxes more readily than can other dogs, while certain indigenous South American dogs are difficult to cross with European dogs.

Differing degrees of sterility between the species in the same genus are also seen in the Canadian experiments in crossing such distinct species of bovines as the buffalo (American bison) and yak (wild ox of Thibet) with domestic cattle.

The degree of chemical affinity in the chromosomes of the germ-cells, reflected in the degree of fertility

between these three species, is seen to follow the same curve as does that of their "structural affinity".

For instance, there is greater difficulty in crossing the buffalo with domestic cattle than in crossing the yak with domestic cattle. The yak, being zoologically intermediate between the buffalo and domestic cattle, it may be expected that the chemical constitution of the chromosomes of the germ-cells in the yak would be intermediate between that of both the buffalo and domestic cattle, thus enabling the yak to more readily cross with both the buffalo and domestic cattle, and so making possible the production of an artificially made "mixed breed" of bovines by continued careful selection and mating.¹

Probably, however, it will be found necessary in the future to infuse one or other of the pure aboriginal species into this "mixed breed" from time to time, in order to maintain fertility in this unnatural, artificially produced hybrid race, which is known as the Cattalo, perhaps better named the "Buffalox".

That the yak, although it is zoologically nearer to domestic cattle than is the bison, is nevertheless an entirely distinct aboriginal species, is shown by the fact that instead of the familiar "moo" of domestic cattle the yak has a peevish grunt, and instead of an ox-like tail it has a horse-like tail, something like that curious South African genus the gnu, whose body and crupper, as well as the tail, neck, and mane, resemble those of the horse, while the horns are like those of the South African buffalo.

Zoologically the gnu is a distinct "composite type", intermediate between the Equidæ, Bovidæ, and Antilopidæ, to neither of which can it therefore be related, another instance showing the fallacy of taking

¹ E. C. Crohn in *Farmer's Weekly* (South Africa), 27th November, 1929.

“ structural affinity ” as evidence of “ relationship ”.

The buffalo, the gnu, the yak, and the ox, like the ass, the quagga, the zebra, and the horse, are all so many *unrelated* gradations in mere “ structural affinity ”.

In England the “ ring-necked ” species of pheasants (Chinese) was the prevailing type until (about 1870) the “ all green-necked ” (Mongolian) species was introduced. These latter were freely crossed with the ring-necked, and the cross is said to predominate in England to-day. Since, no doubt, the pure “ ring-necked ” has continued to be freely infused into the hybrids, the ring-necked will probably, in the course of time, once more become the prevailing type—unless the Mongolian type be from time to time infused into the hybrids.

The “ Hiatus in Darwinism ”

The distinct origin of each species is the only answer to the important question put by Darwin in the following words : “ How can we account for species when crossed being sterile, or producing sterile offspring, whereas, when varieties are crossed, their fertility is unimpaired ? ”

Now, it is of the greatest importance to bear in mind that the so-called “ varieties ” here referred to by Darwin are the domestic breeds of animals, which are not “ natural varieties ”, but are artificially “ modified portions ” of species.

Huxley, commenting upon the universal *sterility* between the species of the same genus and the universal *fertility* between the domestic breeds, remarks as follows :—

“ A true physical cause is, however, admitted to be

such only on one condition,¹ that it shall account for all the phenomena which come within the range of its operation. If it is inconsistent with any one phenomenon, it must be rejected ; if it fails to explain any one phenomenon, it is so far weak, so far to be suspected, though it may have a perfect right to claim provisional acceptance. . . . Our acceptance of the Darwinian hypothesis must be provisional so long as one link in the chain of evidence is wanting ; and so long as animals and plants certainly produced by selective breeding from a common stock are fertile, and their progeny are fertile with one another, that link will be wanting.”¹

The Wanting Link in the Chain

The wanting link in the chain, however, is not so much a wanting link of evidence as a wanting recognition of the fact that the domestic breeds of animals—“certainly produced by selective breeding from a common stock”—are not, as supposed by Darwin and Huxley, “varieties” in the Darwinian sense, but are artificially *modified portions of species* and, as such, invariably fertile with one another, whereas species of distinct origins are invariably *sterile inter se*, or produce offspring invariably sterile sooner or later.

The following further remarks were made by Huxley with reference to his objections above quoted: “In justice to Mr. Darwin, however, it must be admitted that the conditions of fertility and sterility are very ill understood, and that every day’s advance in knowledge leads us to regard the hiatus in his evidence as of less and less importance, when set against the

¹ *Man’s Place in Nature*, pp. 148, 149, 150.

multitude of facts which harmonize with or receive an explanation from his doctrines.”¹

In the interests of the truth in the matter, it must be here pointed out that Huxley's apologetic remarks are irrelevant to the question at issue, for whatever may have been the “multitude of facts” which Huxley supposed to have “received an explanation” from Darwin's doctrines, they certainly do not include any facts which *explain* the hiatus in Darwinism. This still stands absolutely *unexplained*—still stands as the *first* of “three cardinal difficulties” urged by Romanes against Darwin's fundamental doctrine of the “derivation of species from species”.

After thousands of years of selective breeding, and the production of various domestic breeds of animals, there is not a single known instance in which a “species” has been derived from a supposed “variety” (artificially produced domestic breed).

Nor is there a single instance in which the derivation of a “natural variety” of animals from a “species” can be proved to have taken place.

Nor a single instance of sterility between the domestic breeds (artificially “modified portions” of the same species).

So far, therefore, as actual test has been possible by thousands of years of selective breeding of domestic animals, not alone has the theory of the “derivation of species from species” received no confirmation or support, but the general evidence is in contradiction of it.

The lesson of Australia also conclusively proves that *species are not derived from species*, but are merely *unrelated repetitions of a type*.

¹ *Man's Place in Nature*, pp. 148, 149, 150.

CHAPTER VIII

SPECIES OF MANKIND

Everything points to the conclusion that the genus *Homo*, like other genera, consists of numerous distinct species, which have each, from the beginning, evolved along parallel lines.

It is most improbable that the so-called "races" of mankind are merely so many "varieties" arising from some one common ancestor, as is commonly supposed.

There is no genus consisting of numerous "varieties" only, and *Homo* is not likely to be the sole exception.

Many Cradles

The polygenic origin of species is the only explanation of the fact that fossilized remains of many different types of extinct human species, and even genera, are constantly being found in widely separated regions of the earth.

Though of exclusively African origin, the "Boskop man" does not resemble the existing primitive Bushman race of South Africa—which latter is probably a later evolved African species.

It is unscientific in the extreme to suppose, as some anthropologists do, that the exceptionally large-brained extinct Boskop species, having a brain capacity quite equal to if not greater than that of modern man, was ancestral to so small-brained a Negro type as the

South African Bushmen.¹ No organ such as the brain, developed under long ages of use, can shrink in size while still in *full use*. Such primitive Negro species as the Boskop man (Transvaal) have, like the Neanderthal men of Europe and Palestine, become extinct lines leaving no descendants in modern man. Anyhow, these extinct "big-headed" Negro species have left absolutely no indication whatever of a commensurate intelligence—notwithstanding certain crude mural paintings, which, it is merely supposed, may have been done by them. Crude mural paintings of animals and other objects around the rock dwellings of primitive man are the common artistry of widely separated and unrelated species of early man from South Africa to Australia. Though the Boskop type of early South African Negroes has become extinct, the Rhodesian man (Brokenhill), judging from the massive character of the eyebrow ridges, may very well be the Pleistocene ancestor of the existing Korannas, just as the very primitive Taungs skull may well belong to the Pleistocene ancestors of the existing primitive Bushmen of South Africa.

It may be taken as certain that all remains of "primitive man" found in Africa, species which have originated in Africa from the beginning, will be "primitive Negroes", having "wool", not "hair", upon their scalps.

The woolly-headed Negro is an African genus, consisting of several species, such as the Bushman, Hottentot, Koranna, and other woolly-headed African species.

No woolly-headed African species can ever have been the ancestors of, or even related to, any species of mankind with hair-covered scalps found outside of Africa.

Africa is both the birth-place and the cradle of the true woolly-headed genus of mankind.

So that any Neanderthal affinities found in the skull of the woolly-headed "Rhodesian Man" could only be "unrelated structural affinities".

So would be any Neanderthal affinities found in the skulls of the widely separated Peking and Java "primitive men".

We may, I think, safely assume that the Neanderthal and Piltdown skulls belong to "primitive Europeans" (Caucasians), the Peking skull to a "primitive Mongolian", the Java skull to a "primitive Malayan" man, and the Rhodesian skull to a "primitive Negro" (woolly-headed African). Further, that all these widely separated skulls belong to distinct species which have most probably originated within the regions in which the skulls are found.

The following also denotes separate origins of species from the beginning. Professor H. B. Fantham, in a recent paper read before the South African Science Association at Durban, Natal, shows that "The races of mankind are separated by relative differences in the balance of their internal secretions. The Negro races are sub-adrenal, the yellow or Mongolic races are sub-thyroid, while the white or European races show pituitary dominance."¹

It would be more correct to speak of the races named as separate "species".

In fact the Negro species of Africa should be classed as the "woolly-headed"² genus of mankind, and as quite distinct from the "hairy-headed"³ genus of the rest of the world.

Dr. H. L. Gordon⁴ of Nairobi has pointed out—

¹ *Eastern Province Herald*, Cape Province, South Africa, 6th July, 1932.

² Consisting of several distinct species of exclusively African origin.

³ Consisting of the many distinct species of Europe, Asia, Arabia, Polynesia, Australia, and the New World.

⁴ *Natal Mercury*, 9th December, 1933.

“ That from the ages of 10 to 20 the European’s yearly brain growth averages 17·7 cubic centimetres while the Native’s is 8·5. Though both brains increase till puberty the European curve rises steeply thereafter, while the Native curve is almost stationary . . . the Native cortex showed a 15 per cent quantitative deficiency and contained cells smaller and less well formed and arranged than the European brain.”

Again it is pointed out by Dr. Sampson that—“ The frontal sutures of the skull unite much earlier in the Native than in the European. Consequently the frontal lobes of the brain are limited for space in which to expand.” Dr. Sampson suggests the possibility that—“ The Native brain tends to a point midway between the European and the higher ape.” The brain structure, therefore, of the Pleistocene ancestors of the “ woolly-headed ” species of Africa must have been less typically human in pattern than was the brain structure of the Pleistocene ancestors of the European (Caucasian) species. This would apply especially to the Pleistocene ancestors of the South African Bushmen, see remarks on the Taungs skull in Chapter IX (Man and Ape).

Merely because there are certain resemblances between the mural paintings and stone implements of the Australian aborigines and some of those found in South Africa, and because some skulls of primitive types found in South Africa appear to possess certain “ structural affinities ” with those of the aborigines of Australia, the improbable idea, based on mere “ affinities ”, has been put forward that the Australian aborigines (with stiff hair) originated from the woolly-tufted Negro type of Africa, and spread thence over the rest of the world !

As if there could not possibly be two “ primitive types ” of *Homo* possessing “ affinities ” evolved

without "relationship" in 'different regions of the earth's surface.

And what more likely, and more natural, than that the simple mural paintings representing similar objects, and simple implements of stone *made for the same uses*, by unrelated "primitive" races in widely separated parts of the world, should in many respects closely resemble each other? The surprising thing would be if these things did not do so.

The theory has from time to time been put forward that a certain region of the earth's surface was the "cradle of the human race"—as if there could only have been *one* cradle for all the species and genera of mankind—extinct and existing!

Perhaps the most widely prevalent theory is that claiming that the Central Asian plateau was the "cradle of all mankind".

In the hope of finding support for this theory, a specially equipped scientific expedition for this purpose has been recently despatched to Mongolia.

Another scientific expedition recently despatched to the Kalahari desert appears to have come to the conclusion that *that* region was the cradle of all mankind!

The various evidences upon which all these claims rest merely go to show that there have been not one, but many cradles of many different human species in many different parts of the earth's surface.

The skulls of the Java and Piltdown primeval men in many respects are so dissimilar that they are admittedly a puzzle to anthropologists to explain how two human beings, probably living about the same time, could have possessed skulls so incompatible with one another. This puzzle, however, does not exist when it is recognized that each of these skulls belonged to men of different and distinct species

living at about the same time in geographically widely separated regions.

The skull of the Peking man, on the other hand, is altogether distinct from, while it possesses only certain features in common with, the Java and Piltdown skulls. This fact, it has been alleged, shows that the Peking skull forms a "link" between the Java and Piltdown skulls.

Now, the term "link" under the Darwinian theory is always used as denoting "relationship" by descent from a "common ancestor". The fact, however, that the Peking skull is *itself altogether distinct*, while possessing only certain features in common with the admittedly incompatible Java and Piltdown skulls, seems to me to afford the strongest possible evidence that *all three* skulls belonged to geographically widely separated and distinct species of *Homo*—mere "links" in the chain of "structural affinity", and nothing more. The several types of *Homo*, as seen in the skulls of the Java, Piltdown, Peking, and Broken Hill (South Africa) primeval men, are each so distinct, and so widely separated geographically as well, that they are all incompatible as "links" in a chain of descent from a "common ancestor".

Distinct Species of Homo

The woolly-headed Negro, Bushman, and Hottentot races of Africa, the pygmy races of Central Africa, the dwarf race of the interior of New Guinea, the Papuans of New Guinea (who have spirally twisted hair, not true wool like the Negroes of Africa), the Australian aborigines, who have straight, stiff, black hair, the Tasmanian aborigines, the Veddahs of Ceylon, and the Andaman Islanders are such distinctive types that they must be all unrelated species.

Then there are the Fuegian natives, to whom Darwin has referred as men "whose very signs and expressions are less intelligible to us than those of the domesticated animals".

Such distinctive types of mankind as the Negro, Caucasian, Aztec, and Mongol are no doubt all distinct and unrelated species, which—like the thirty-five lemur species of Madagascar and the ten species of orang in the islands of Borneo and Sumatra—have all independently evolved along parallel lines.

The species of the genus *Homo*, however, appear to possess a sufficiently close chemical affinity in the chromosomes of the germ-cells to bring about hybrid or "mixed races".

Nevertheless, even in *Homo*, the degree of chemical affinity in the chromosomes (and therefore of fertility between them) differs in the different species. Generally, the more *unlike* the species, the smaller the degree of chemical affinity in the chromosomes and, therefore, the smaller the degree of fertility in the hybrids.

This is seen in the hybrids between such unlike types as the European and woolly-headed Negro types, in which complete sterility sets in after a few generations of intermarrying among the hybrids.

Theal, the South African historian, in the *Story of the Nations Series* (South Africa), referring to the Griquas, a diminishing (Negro-European) hybrid race of South Africa, says: "It was not then known that they were a perishing race. For one or two generations the hybrid offspring of Europeans and coloured people possess a fair amount of fertility, but they must then intermix with one of the pure original stocks, or die out.

Within fifty years the Griquas, by attempting to live

as a separate people, have decreased to little more than a fourth of their original number."

So long as one or other of the pure types is allowed to intermarry with the hybrids from time to time, fertility can be thus indefinitely maintained among them.

The so-called "mixed races" can in this way be kept fertile for centuries, which has probably helped to keep going the idea that all mankind are "varieties" of but one species. Hybrid races cannot make new species.

Suppose, however, that admixture of one of the pure types were to cease; such pure type would gradually become "bred out", and finally disappear from the "mixed race", the predominating type of which would be that of the pure type or types which continued to be infused into it.

This is seen in the Negro races along the eastern coast of Africa, in which traces of Arab features can still be seen in many Negro families, the result probably of Arab infusion for centuries farther north along the coast.

I have in mind a remarkable instance among my own native servants, in which the male child of pure Negro parents with typically woolly heads, flat noses, and black skins, was born with light yellow complexion, straight black hair, and Arab features.

Not only so, but the inborn instincts of this boy were those of the Arab trader—quite unlike his black-skinned Negro brother—for he left his people in the country and opened a small retail shop in the sea-port city of Port Elizabeth in which he did quite well.

So strikingly different was he from all his people and parents, that he was named VELAPI by them, which in their language means "Where do you come from?"

No doubt in the course of time all trace of Arab infusion will disappear from these people, and the pure, flat-nosed, thick-lipped, woolly-headed, black-skinned Negro type alone will remain.

A true blend between two distinct species of genus *Homo* can only be maintained by a constant infusion of one or other of the pure species—in itself evidence of the distinct origin, and inviolable specificity of species.

Were a first hybrid cross between the Negro and Arab to be strictly isolated and mated together, no doubt the hybrids would become extinct after a few generations through breakdown of fertility.

The White Indians of Panama

It would be a mistake to suppose that the so-called White Indians of Panama afford evidence of the “derivation of species from species”.

To begin with, the all-important point, which apparently is overlooked in this matter, is that there is *conscious selection and isolation* at the back of the community of White Indians, due to the aversion of the normal dark-skinned members of the tribe to intermarry with the white.

Were it not for this conscious selection and isolation of white “sport” individuals, no community of white Indians could have arisen, because had indiscriminate intermarriage of an occasional white “sport” with the normal dark-skinned members of the tribe continued to take place, these must inevitably have been swamped by the normal dark-skinned majority, under the conservative force of heredity.

Though when two white Indians marry their children are *always white* (the white colour behaving like a Mendelian “recessive”), it must be remembered

that the dark colour of the tribe is the normal Mendelian "recessive" in this case—not the white.

So that the white skin colour appearing as a "recessive" feature in the offspring of the white Indians is an altogether abnormal phenomenon, and can only be ascribed to an abnormal tendency in the chromosomes of this tribe of Indians to vary by reduction of pigment. So strong, indeed, is this tendency, that the normal Mendelian "recessive" (dark skin) disappears for good in the offspring of the white Indians!

This fact probably indicates that the whole of this tribe of Indians will "go white" in the course of time, but they will still remain *typically Indian in type and in all else*. They will not be brand-new Caucasians. After all "colour" is only skin deep. There is absolutely no "divergence" of type or structure in the white Indians which by the wildest imagination could be supposed to afford evidence of the "derivation of species from species".

The whole matter is one of abnormal reduction of pigment in the chromosomes—a tendency which evidently is stronger in the chromosomes of some species of the genus *Homo* than in others.

The case of these white Indians is interesting merely as affording presumptive evidence that the ancestors of all the white species of mankind were probably dark-skinned originally—or at least darker-skinned than their white descendants of to-day. Mere loss of colour, however, has not changed the specific type of each white species.

We have to avoid jumping to the superficial conclusion, from the case of these white Indians, that Europeans were originally Indians, or woolly-headed Negroes, who have become white. These are all species

of distinct type and origin from the beginning. Some, like the Indians, have "gone white", and some have not, but none have lost their *species type*, whether they have lost their colour or not.

All the New World types of *Homo* have most probably been independently evolved there *ab initio*. So have all the woolly-headed Negro types of Africa been evolved in Africa and nowhere else.

That the ancestors of the existing white species of mankind were darker-skinned than their descendants of to-day receives some corroboration from the fact that all the existing "primitive" species of mankind are more or less dark-skinned. Not one is white. No woolly-headed species of Negro type has ever become white.

The white races are strictly confined to the species that have hair (not wool), and many of these even do not possess the chromosome tendency to reduction of pigment, as is shown by the swarthy, straight-haired millions of India, China, and Japan, and the frizzy-haired species of the Polynesian and Australian region—none of which have ever become white.

It has been recently found by one of the Professors of the Smithsonian Institute, that about twelve per cent of the skeletons of Eskimo which have been examined show that they possess a 25th rib instead of the usual twenty-four ribs of mankind.

This is supposed to indicate that evolution in man is advancing to greater structural perfection. Why it should be doing so only in this rather primitive species of mankind is not clear.

Most probably, however, the 25th rib of the Eskimo is a gradually disappearing structure (an atavistic structure) in about 12 per cent of the individuals of this distinct species of mankind.

It would be interesting to know whether the 25th

rib is found to be (as is probably the case) present as a pre-natal structure in an early foetal stage in *all* individuals of the species, disappearing in the adult stage in most individuals of the species, while persisting throughout life in about 12 per cent of the species. This would prove that the 25th rib is merely a disappearing atavistic structure in this species.

The Writing on the Wall

As we go back in time, there is evidence in fossil remains not only of distinct species, but of distinct genera of mankind—all of which have long since become utterly extinct!

If "species" arise from "varieties", and "genera" from "species", then human species and genera should be increasing—not decreasing.

The conditions on the earth were just as favourable to man's existence when those species and genera became extinct as they are to-day.

Why then have so many species—some of them of outstanding physique—vanished from the face of the earth?

Organisms (both in the "Life-span" of the individual and the "Time-range" of the species) are physico-chemically determined *organic growths*, and like all organic growths, have a definite series of organic phases of existence—birth, maturity, and final decay.

A gradual decadence of fertility within the species itself is the most probable natural cause of extinction of species.

Just as there is a natural "life-span" for the individual, so there is a natural "time-range" for the species.

Extinction of species by lapse of "natural time-

range" can only be due to a gradual, physico-chemically determined decadence of fertility within the species itself.

We see this subtle natural agency distinctly at work to-day among the aboriginal natives of the Marquessas Islands, lying in the Pacific Ocean between Australia and South America. Not many years ago these natives numbered about 70,000, whereas to-day—from no other apparent cause than that of a gradual decadence of fertility within the species—there are now only some 2,500 survivors of a perishing species.¹

Probably the same subtle natural cause explains the comparatively recent extinction of the aboriginal natives of Tasmania, and also the complete extinction of the Guanches—that mysterious race discovered by the Spaniards in the Canary Islands.

I have seen it stated by a recent Australian writer that the aboriginal natives of Australia are steadily decreasing in number.

Lapse of natural time-range can be the only explanation why certain human species have long since become extinct, while certain others continue to exist. Different time-ranges imply different origins both in time and space.

Reading the future by the grim evidence of the past, it will most probably be lapse of natural time-range which will finally remove Man from the face of this planet.

The conditions favourable to his existence here will probably continue for ages beyond his final disappearance.

¹ A visitor to the islands giving this information states that most of the remaining natives are sterile. Another visitor to these islands ascribes the diminishing native population to epidemics following the coming of the white man. Now, epidemics do not cause general sterility in the population. Why then has not this been the case with the natives of many other islands "with the coming of the white man"?—AUTHOR.

CHAPTER IX

MAN AND APE

Anthropology, in sympathy with the trend in biology away from the old serial towards the multi-serial idea of "divergent" lines of descent, has already pushed back the supposed descent of man from some form of "anthropoid ape" to the idea of the "collateral descent" of man and ape from some earlier "ape-like common ancestor".

This trend in anthropology still continues. The supposed "common ancestor" of man and ape continues to be pushed ever further and further back towards some quite undefined ancestral form existing at some period even antecedent to the "ape-like" phase.

I submit that this trend has not yet gone far enough, and that any theory which still postulates a "common ancestor" for man and ape, at any stage whatever, has within it the inherent weakness of the Darwinian theory.

Common ancestry can only exist within the species. It begins and ends in the species. Man and the apes, therefore, have had no "common ancestor" at any stage of their evolution.

When the theory of "common ancestry" is applied, for instance, to the order Primates, the little worth of "structural affinity", as evidence of "relationship", becomes apparent.

For example, take man, ape, monkey, baboon, lemur, lemuroid, and bat: the latter was at one time

included in the order Primates because of "structural affinity", but has now been removed from it. Why not go further with "removals" from the order, seeing that it is mere "structural affinity" why all the rest are still retained in the order?

We here see "structural affinity" gradually diverging more and more, until the forms in the different groups become so widely different that the Darwinian idea of "common parentage" for the order becomes out of the question.

Not only is there no common parentage between the different groups of the order Primates, but there is none between the different species comprising each group.

All the species of the different groups have, no doubt, evolved along concurrent lines from the beginning, as similar species of Palæozoic fishes, amphibians, reptiles, and finally of Quadrumana and Bimana, as we see them to-day—*always more or less similar at every phase, but never the same.*

Old World Quadrumana Specific

The Catarrhine monkeys and apes of the Old World differ markedly from the Platyrrhine monkeys of the New.

The fact that the islands of the Oriental region are *par excellence* the region of diversified "ape-like" forms, cannot be explained by the Darwinian theory of "descent from a common ancestor" of the region. The diversity of form is too great, and the various islands on which they are indigenous too isolated.

In the island of Sumatra, for instance, we find indigenous oranges, lemurs, and galeopithecii.

In the island of Borneo, indigenous oranges, gibbon pes, lemuroids, and galeopithecii.

In the island of Java, indigenous gibbon apes. In the island of Timor, indigenous macaques. In the island of Celebes, indigenous lemurs. In the Philippine Islands, indigenous lemuroids and galeopithecii. In the Malay Peninsula, indigenous chimpanzees, lemurs, and galeopithecii.

Three facts emerge from the above distribution of the *Quadrumana* named, which are fatal to any theory of "common parentage", namely: (1) The complete isolation of the islands, (2) the specific differences in the species of the different islands, (3) the great diversity of form.

A "common ancestor" of the region, then, being out of the question, the remarkable prevalence of diversified "ape-like" forms in the isolated islands of the Oriental region can only be due to inherent chemical character in the original protoplasm of the region.

Selenka (in 1899) distinguished fully ten distinct species of orang within the islands of Borneo and Sumatra, consisting of two distinct genera (*Dissatyrys* and *Eusatyrys*).¹

Had all these ten distinct species of orang originated from "varieties" descended from a "common ancestor" in one or other of these islands, why has the process of splitting off into "varieties" ceased at the ten species? Why, in fact, has it not gone on indefinitely upon both the islands?

The very fact that these ten species, though for ages past living side by side in the islands, consist of two distinct genera within the limited areas of these two islands, is fatal to any theory of their "common parentage".

¹ Haeckel's *Evolution of Man*, vol. i, p. 403.

Similarly there are some thirty-five distinct species of lemurs within the island of Madagascar; many of them, such as the little aye-aye, the ring-tailed, the *Propithecus coronatus*, and the *Indris*, are so altogether different from each other, and from all the other species in the island, as to exclude all question of common parentage.

Here, again, had all these distinct species originally been "varieties" descended from a "common ancestor" in the island, as the Darwinian theory implies, why has the process of splitting off into "varieties" completely ceased?

The fact that all these species have never crossed, and have for ages remained absolutely distinct within the island of Madagascar, proves their *separate origins* within the island.

Besides the diversified groups of Old World Quadrumana of the Oriental region, and the extensive group of Madagascar lemurs, there are the gibbon apes and macaques of Asia, and the numerous species of lemuroids, monkeys, baboons, gorillas, and chimpanzees of Africa. Even the chimpanzees of Africa are specific, the bald-headed differing altogether from the black species!

New World Quadrumana Specific

The Platyrrhine monkeys of the New World all differ markedly from the Catarrhine monkeys and apes of the Old.

The former have *flat noses* and thirty-six teeth, while the latter have *down noses* and only thirty-two teeth. There are other marked differences between the New and Old World Quadrumana, which absolutely differentiate them.

Even the Platyrrhine monkeys of the New World consist of two distinct types, the one alone consisting of some thirty distinct species. The differences between the monkeys of the New World itself make any question of common parentage between them out of the question.

The little marmosets, for instance (in one species of which the individuals weigh only about one ounce each !), are more like squirrels than monkeys ; differing so much from the other New World monkeys, that they are not even included in the Platyrrhini !

Many Scores of "Ape-like" Creatures

Where then does " common parentage " begin and end in this host of diversified " ape " and " ape-like " creatures of the Old and New Worlds ?

If mere " structural affinity " be our reason for assuming a " common ancestor " for man and anthropoid ape, then for the same reason we should assume " common parentage " for these and the other apes, and for these again and the lemurs and lemuroids.

Had not the bats been removed from the order Primates, man would still have been tied by an unbroken chain of supposed " common parentage " (merely because of " structural affinity ") not only to the lemurs and lemuroids, but even the bats.

Some of us may even have preferred the bats to the apes as " relations ". There is, however, no need for despair since " relationship " in either case is merely a mistaken Darwinian assumption.

When we so readily speak of man and ape as " collateral branches " descended from some " ape-like common ancestor ", it would be well to remember

that the term "ape" is pretty elastic, and that under the misleading criterion of "structural affinity" as evidence of "common parentage", there is no hard and fast line possible between man and bat.

Misleading "Structural Affinity"

The danger of relying too much upon "structural affinities" found in fragmentary remains of "primitive man" has been very clearly shown in the case of the Java "primitive man", the skull and two teeth of which were at first definitely acclaimed as belonging to the hypothetical "missing link".

This claim, however—fortunately for the truth—has had to be abandoned owing to the further discovery, in the same deposit, of a thigh-bone and fragmentary jaw apparently belonging to a much higher human type than that shown by the brain-case of the skull.

Even, however, had the fragment of jaw indicating a much higher human type not been found in the same deposit, the brain-case of the skull is that of a being *much nearer to man* than to the anthropoids, and therefore most probably belonged to a species of "primitive man" possessing a very low brain capacity.

But even if the early ancestors of man at one time possessed a brain capacity no higher than that of the existing anthropoids, it could in no way prove relationship between man and the anthropoid apes, nor that the ancestors of man were, even at that stage, in other respects typical anthropoid apes.

As we go back in time the early ancestors of man are bound to have possessed more and more crude resemblances to modern man, and which would be

more and more likely to be confounded with pithecoïd characters.

So long, therefore, as anthropologists continue to labour under a fixed belief in "common parentage" between man and the apes, there will be danger of having some of the early ancestors of man (say, of the Miocene or Pliocene) classed either as apes or as "common ancestors". Now, fragmentary remains such as the skull, jaw, or teeth, and especially the teeth, are not safe guides in themselves alone.

I submit that relative length of arms and legs would (along with skull, jaw, and teeth) be a far safer guide by which to differentiate between the early ancestors of man and ape. Without exception the existing anthropoid apes have relatively longer arms and shorter legs, while man has relatively shorter arms and longer legs.

We may be sure that such basic features as the relative length of fore and hind limbs (due to definite morphogenesis) have been constant features inherited by man and ape from their respective reptile ancestors, and would therefore constitute the safest guide in tracing the early ancestors of man. Without the corroboration of this test, satisfactory reliance cannot be placed upon such fragmentary remains as skull, jaw, or teeth only.

The danger of confounding crude human characters with pithecoïd characters in the early ancestors of man, when relying upon such fragmentary remains as skull, jaw, and teeth only, has been very clearly shown in the case of the Java skull.

Dr. Hedlicker, Professor of Anthropology at the Smithsonian Institute, has recently shown that the Java skull is that of a woman. It is entirely misleading to continue referring, as Darwinians still do, to the

Java skull as that of *Pithecanthropus erectus*, at one time believed to be the Missing Link.

Can reliance be placed, in cases such as that of the Java skull, upon the findings of anthropologists labouring under a fixed belief in the "common parentage" of man and the apes?

As in the case of the Java skull, at first believed to be that of a kind of erect ape-man, I do not believe that the Taungs skull is that of a young anthropoid ape, as supposed, nor that of a creature neither man nor ape, but is that of a child belonging to a primitive African Negroid race.

The general outline of the skull, forehead, jaw, and profile is typically human (African Negroid type).

The mere size of the milk molars is of far less significance than is their practically typical human pattern, as is also the case with some of the structures in the skull.

The nature of the country, too, in which the skull was found, and fossil bones found in association with the skull, are against the anthropoid ape theory, but quite compatible with that of a primitive Negroid nomad race. Now there can have been pleistocene species of man *far less advanced*, and possessing a far less typically human brain than any other known pleistocene species—yet not anthropoid ape for all that.

To such a pleistocene Negroid species the Taungs skull more probably belonged. Nor could such an African (woolly-headed) species ever have been the ancestors of, or related to, any Caucasian or other races having hair upon their scalps.

It is, however, quite possible, and indeed very probable, that the Taungs skull belongs to a pleistocene Negroid ancestor of one or other of the existing South African Negroid species, such as the Bushman, Hottentot, or Koranna.

We may expect to find that the pleistocene ancestors of such Negroid species as those named (and which even to-day show somewhat pithecoïd features) would have exhibited more pithecoïd characters than would, for instance, the pleistocene ancestors of the Caucasian races. We should not therefore, I think, make the mistake of classing the Taungs skull as that of a young anthropoid ape, merely because the standard of its human characters falls much below that of pleistocene man found in other regions of the earth where the highest types of modern man are found to-day.

The evolution of so complex a structure as the brain naturally would need a much longer period of time to become typically human in pattern, than would the simpler structure of the teeth, hence, probably, the far greater degree of approach to the typical human pattern shown by the teeth, as compared with that shown by the brain convolutions in the Taungs skull.

The Rhodesian man's skull, as we shall see below, affords the same lesson in anthropology as does the Taungs skull. Referring to the skull of the Rhodesian man Sir Arthur Keith says—"His eyebrow ridges are the most massive ever seen in a human skull; these ridges are almost ultrasimian in their massiveness. His heavy face is reminiscent of that of the male gorilla, but his teeth and his palate, massive as they seem, are altogether human. Indeed we may say that the teeth of Rhodesian man have ultra-human attributes"¹—and yet the brain is of *simple structure*.

Thus we find in both the Rhodesian man's skull and in the Taungs skull that the teeth are *far in advance* of the brain in their "human attributes"—no doubt for the evolutionary reasons pointed out in the case of the teeth in the Taungs skull.

¹ *John O'London's Weekly*, No. 778, 10th March, 1934.

Yet the Taungs skull has been classed as "anthropoid ape", while that of the Rhodesian man is classed as "man". I maintain that both are the skulls of Pleistocene Negro species, the Taungs skull belonging to the more "primitive" species of the type.¹

We have seen in the last chapter that some Pleistocene Negro species, such as the extinct Boskop man, were exceptionally "large-brained," yet have left no indication of a commensurate intelligence. Clearly, then, brain-bulk in the woolly-headed Negroes is no measure of intelligence. This may be explained by the important investigations by Dr. H. L. Gordon of Nairobi into the structure of the Negro brain referred to in the last chapter, which show that the Negro brain "... contained cells smaller and less well formed and arranged than the European brain." Thus it would seem that intelligence does not depend so much upon "brain-bulk" as upon brain-cell structure.

It does not follow that the brain structure of all Pleistocene species of man must necessarily have approached that of modern man in the same degree. The Taungs skull, for instance, probably belonged to a (South African) primitive Negroid species—the most primitive Pleistocene species as yet discovered—while the Oldoway man (East Africa) appears to be, according to Dr. Leakey, "an early *Homo Sapiens* ancestor"—that is to say a Pleistocene species more nearly resembling modern man than any Pleistocene species as yet discovered. The Oldoway species however could not have been ancestral to all the species of modern man—in fact it could only be ancestral to but one species of modern man—there being no such thing as "derivation of species from species".

¹ The lesson taught by the teeth of both the Rhodesian and Taungs skulls, should make us very careful where we place the so-called *Dryopithecus* of the Miocene and Pliocene, whose teeth exhibit "human attributes". They were certainly not "common ancestors"—there being no such thing. —(AUTHOR.)

The Oldoway¹ man probably belonged either to a Pleistocene species which had developed more rapidly than some other Pleistocene species, or was an older, and therefore more advanced species than any Pleistocene species as yet discovered. In either case this would denote entirely separate origins from the very beginning. No doubt Pleistocene man consisted of many quite distinct species just as modern man does to-day. There is however a greater general structural resemblance between the species of modern man than there was between the species of Pleistocene man.

As time goes on this would ultimately tend to become so even in unrelated species of a genus evolving under the physico-chemical law of definite morphogenesis, as there is no such thing as divergence into new species or new genera. Mankind consists of only two genera to-day (distinct from the very beginning), namely, the "woolly-headed" genus of Africa, and the "hairy-headed" genus of the rest of the world. No new genus can ever arise by "divergence", as stated above. The now extinct species and genera of Pleistocene man were no doubt developed from distinct species and genera of reptile ancestors.

In trying to trace man's ancestry, the danger of relying too much upon "affinity" found in any one structure in the skulls, teeth, or bones of fossilized remains of man or ape, can be seen in the structures of the existing lemurs and apes.

For instance, the little worth of "dentition" as a guide to common parantage is seen in the "rabbit-like" teeth possessed by the aye-aye, a small lemur of Madagascar.

Supposing that a fossilized lower jaw and teeth of this animal were to have been found, what would the aye-aye have been classed ?

¹ Apparently also called Kanam and Kanjera man.

Again, take the South American bat (*Noctiliones leporinus*) which, in its teeth, so closely resembles the "dentition" characteristic of the rodents that it has been removed from the bats and placed among the *Rodentia*.

Supposing that a fossilized lower jaw and teeth of this bat were to have been found, where would it have been placed *dead and gone*—when even misplaced alive? Let us not forget that the bats were at one time, as the result of the false value attached to mere "structural affinity" as a guide to common parentage, placed among the Primates (with man at the head!)

If we take the "hands and feet" of the gorilla as a guide, we arrive at the conclusion that man's ancestors were gorilla-like.

If we take the "chest" of the gibbon apes, we arrive at the conclusion that man's ancestors were gibbon-like.

If, again, we take the skull and teeth of the chimpanzee, we arrive at the conclusion that man's ancestors were chimpanzee-like.

Now, all these apes greatly differ among themselves, and they each consist of several distinct species.

Since, however, between them they merely represent a kind of mosaic of the different parts of human anatomy, and each resembles a part of it, we cannot allow any one part of this patchwork the claim of "cousinship". They cannot very well claim this even among themselves.

Man and the apes have probably independently developed, along concurrent lines, from *unrelated evolutions* of lemuroid, tarsioid, and "ape-like" ancestors.

Naturally, there will be found in all these advancing phases of the Primates an independently acquired

brain development,* also along concurrent lines, and having nothing to do with "relationship".

These lemuroid, tarsioid, and somewhat "ape-like" ancestors from which man has independently come, have probably (all along the line) foreshadowed *Homo* in forms more *Homo-like* than any of the ancestors of the apes.

A Purely Imaginary "Divergence"

No good reason has ever been shown why one branch from a supposed "common ancestor" became man while the other has remained ape.

It is all very well to construct theoretical causes of a purely imaginary "divergence", namely, that one branch took to open country and a carnivorous diet obtained by hunting, gradually learned to walk upright, and so became man, while the other remained in the trees and therefore remained ape.

This way of meeting the difficulty is more Lamarckian than Darwinian. Were the advance of man to be ascribed to "natural selection", it would be rather rough on the apes to have them left so far behind merely for sticking to the trees.

If it were a mere matter of environment, it is obvious that an environment of trees is the one most favourable for a tree-climbing, ape-like creature to gradually acquire an erect posture by having always at hand supports to hold on to at first, just as a child to-day first learns to stand upright by holding on to supports with its hands.

As a matter of fact there are to-day several species of dwarfs or pygmies, who continually live, and no doubt have always done so, in the depths of dense primeval forests, and have not therefore remained apes.

These pygmies show that man had acquired not only a "semi-erect" but an altogether erect posture while still living in forests, and reveal the fallacy of the "open-country" hypothesis as to man's "erect posture" and supposed "divergence".

Man could gradually have acquired the erect posture by first walking on the ground from tree to tree. The pygmies show this to be so.

The differences between man and the apes are not a mere matter of trees or open country, but of definite (physico-chemically determined) morphogenesis, which determines inherent structural differences (such as comparative length and structure of fore- and hind-limbs) regardless of environment.

Compared with the apes, man's shorter arms and longer legs no doubt have tended to force him into the more easy carriage of an erect posture. On the contrary, their comparatively longer arms and shorter legs have kept the apes merely "semi-erect" and in the neighbourhood of forests.

As in the case of man, the *short* fore-limbs and *long* hind-limbs of the kangaroo and kangaroo-like animals have forced them into the more easy carriage of an erect posture.

Both man and the kangaroos have no doubt inherited the comparative shortness of their fore-limbs and length of their hind-limbs (the real cause of their erect postures) from their respective reptilian ancestors—the mammal-like *Therapsida* of the Permian and Trias.

In man and the apes, likewise, the differences in length and structure of their fore- and hind-limbs began, no doubt, in their respective *Therapsid* ancestors. There has been no "divergence" of man and ape from a "common ancestor" at any stage whatever in their respective evolutions.

The truth of the matter, I believe, really is that man and the apes have not advanced along "divergent lines" from a "common ancestor", but along "concurrent lines" from *separate* ancestors *ab initio*.

A Non Sequitur

Undue stress and, I believe, mistaken inference have been put by Huxley upon the fact that "the structural differences which separate man from the gorilla and chimpanzee are not so great as those which separate the gorilla from the lower apes".

Merely because the structures of the gorilla and chimpanzee more nearly resemble those of man than do the structures of the lower apes those of the higher apes, surely is no kind of proof of "common parentage" between the gorilla and man?

The greater degree of "structural affinity" existing between the anthropoid apes and man, is simply the result of the greater degree of "chemical affinity" existing between them as compared with that existing between the other apes and man. In other words, it is not a matter of degrees of "relationship", but of degrees of "chemical affinity".

The monkeys and apes are simply so many grotesque caricatures of man—a relationship of "form" only, and approaching that of man in a greater or lesser degree, according to the greater or lesser degree of "chemical affinity" existing between them and man. "Each organism," says Professor Loeb, "is characterized by a definite form, which is determined by definite chemical substances."

There appears to be a tendency in Darwinian anthropologists to stress similarities and overlook dissimilarities between man and the apes.

In justice to Huxley, however, it must not be forgotten that when referring to the *dissimilarities* between man and the apes, he has expressly stated: "Let me take this opportunity, then, of distinctly asserting, on the contrary, that they are great and significant," which the following anatomical differences will assist in showing.

Evolutionary Signposts

(1) "The occasional existence of a supracondyloid spur, and even a supracondyloid foramen in the humerus, is a well-known anomaly in man. It is not a common variation, and yet the spur is so uniform in its manifestations, and in the peculiar relation to the brachial artery and median nerve, that it is obviously a true reversionary or atavistic variation in man."¹ It is present in insectivora, lemurs, and American monkeys, but is entirely absent in the Old World monkeys and anthropoid apes—the supposed "nearest relatives" of man!

(2) The brain of man consists of a generalized development of the early mammalian brain, and not (as the "collateral" theory would imply) of a specialized ape brain evolved from an "ape-like common ancestor".²

(3) The human tongue, bones, muscles, and blood-vessels more closely resemble primitive mammalian structures than do those of the apes.²

(4) The human embryo, when not more than 24 millimetres long (about 13 times the size of a pin's head) shows "differences of structure that absolutely differentiate it from the embryo of the ape".²

¹ Dr. Wood Jones.

² George Winter in the *Sunday Times* (Johannesburg), 24th April, 1921.

(5) The lobulation of the kidneys, found in man as a primitive mammalian structure, is not found in a single species of monkey or anthropoid ape.¹

The foregoing "Evolutionary Sign-posts" go to show that not alone is there no common parentage between man and the apes, but none between the lemurs, monkeys, and apes themselves.

The many early mammalian structures, found in man and not in the apes, appear to have led at least one anatomist to the belief that the apes have descended from man!

This obviously untenable theory is the penalty paid for a blind faith in "relationship" wherever "structural affinity" exists—the fundamental misconception of Darwinism.

If man and ape have been derived from a "common ape-like ancestor", why is the normal life-span of the ape only half that of man?

The "five-digit" structure possessed by man, ape, monkey, lemur, lemuroid, bat, armadillo, and many other widely separated groups is an instance of the kind referred to by the late Professor Mivart, in which the "resemblances between the organs cannot be due to descent from a common ancestor".

The Blood Test (So-called)

Since "chemical affinity" underlies general "structural affinity", it could have been forecast before the experiment was tried, that the blood of the anthropoid apes would give more "nearly the same reaction" to the blood of man than would the blood

¹ Dr. Max Westenhoefer.

of the lower apes. The test is simply one of "chemical affinity", and has no significance beyond this.

It is an argument often heard, that the many structural "affinities" between man and the apes cannot be the result of mere coincidence. Nor are they. They are the result of definite physico-chemical law. Not of "common parentage".

The important fact that every species possesses its own specific chemical constitution, apparently has no significance in Darwinism. The fact, however, is fatal to the theory of "common parentage" of species.

The absolute specificity existing in the chemical constitution of species is strikingly manifested in the grafting of organic tissue, whether vegetable or animal.

In no case has the tissue of one species grafted upon another been known to assume the characteristics of the host tissue. Both remain absolutely specific.¹

When ape glands are grafted upon the human body they remain specific ape tissue in the character of every cell. Not a single cell of the ape glands ever assumes the character of the cells of the human body, just as an orange graft upon a lemon stock remains specific orange.

Such a strictly defined cleavage line in the union between graft and host tissue is simply a matter of "chemical affinity". There is no real fusion.

"Chemical affinity," and nothing more, explains why the living anthropoid body shows "nearly the same reaction", and is nearly as susceptible to certain bacterial diseases as the blood and body of man.

¹ Loeb in *The Organism as a Whole*, chap. iii, pp. 47 and 48.

Missing Link Fallacy

After a search which has proved, and still is proving, singularly barren of results, modern anthropologists have come to the conclusion that no "link" between man and the ape has ever existed.

We may, in fact, just as well go a-hunting for the "missing link" between the lizard and the crocodile, the entire absence of which Huxley supposed would be "fatal to the doctrine of evolution", which of course it is not.

Recent discoveries of human remains near Peking are said to be "the nearest approach to the so-called 'missing link' as yet discovered . . . overshadowing in importance those of the Piltdown man in England, and the Java ape man".

Such phrases as the "Java ape man" are regrettable, for they tend to keep going the fallacy of the "missing link".

It would be at any rate more correct to speak of the "Java primeval man", the "Piltdown primeval man", and the "Peking primeval man". These, no doubt, are all distinct and *unrelated* species—every one of them.

As time goes on and fossiliferous strata are more and more explored, no doubt, the remains of a more and more *primitive* "primeval man" will be found.

But, however much the structures of these may be found to run more and more parallel with those of the ape, they can never meet in a "common ancestral form", as is implied by the "collateral" theory.

Although it may be said, in a general sense, that mankind have descended from "ape-like" ancestors, it does not in the very least follow that any "ape-like being" was the "common ancestor" of man and the apes.

The "ape-like," ancestors of mankind no doubt differed from those of the apes just as man differs from the apes to-day—a *parallelism of form* all along the lines of their ascent, and nothing more.

Fossil remains never have, and never can, yield conclusive evidence of man's emergence from the true ape form.

Man remains man, and ape remains ape.

THE END

